United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with
United States Department of Agriculture, Forest Service;
North Carolina Department of Environment and Natural Resources; North Carolina Agricultural Research Service;
North Carolina Cooperative Extension Service; Madison Soil and Water Conservation District; and Madison County Board of Commissioners

Soil Survey of Madison County, North Carolina

How To Use This Soil Survey

General Soil Map

The general soil map, which is a color map, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

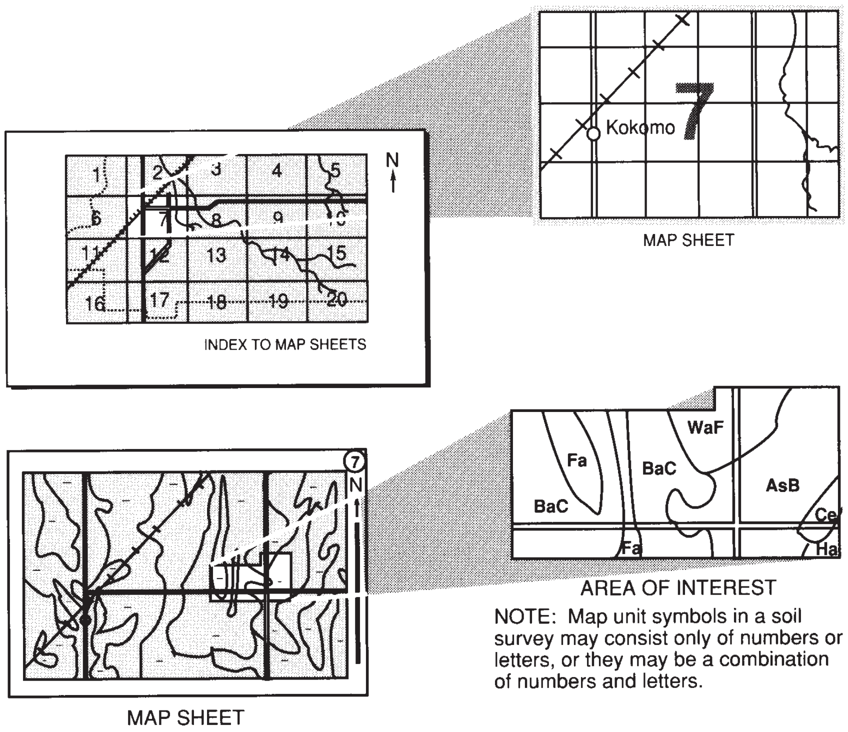
Detailed Soil Maps

The detailed soil maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**. Note the number of the map sheet and go to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Go to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.



NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 2002. Soil names and descriptions were approved in 2006. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 2006. This survey was made cooperatively by the Natural Resources Conservation Service; the United States Department of Agriculture, Forest Service; the North Carolina Department of Environment and Natural Resources; the North Carolina Agricultural Research Service; the North Carolina Cooperative Extension Service; the Madison Soil and Water Conservation District; and the Madison County Board of Commissioners. The survey is part of the technical assistance furnished to the Madison Soil and Water Conservation District. The Madison County Board of Commissioners provided financial assistance for the survey.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

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Cover: View of the French Broad River Valley from Deer Park Mountain near Hot Springs. Areas in the foreground and background (left) are in the Ditney-Unicoi-Northcove-Rock outcrop general soil map unit. The valley area is in the Unison-Biltmore-Rosman general soil map unit. Intermediate mountains in the background (right) are in the Soco-Stecoah-Northcove general soil map unit.

Additional information about the Nation’s natural resources is available online from the Natural Resources Conservation Service at http://www.nrcs.usda.gov.

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Issued 2008

Foreword

This soil survey contains information that affects land use planning in this survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Mary K. Combs
State Conservationist
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Soil Survey of
Madison County, North Carolina

By Mark S. Hudson, Natural Resources Conservation Service

Soils surveyed by Mark S. Hudson, L. Brooks Hale, Milton Martinez, and Brian Wood, Natural Resources Conservation Service, and by Thomas N. Schmitt, Jay Ham, and Tom Cochran, North Carolina Department of Environment and Natural Resources

United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with
United States Department of Agriculture, Forest Service; North Carolina Department of Environment and Natural Resources; North Carolina Agricultural Research Service; North Carolina Cooperative Extension Service; Madison Soil and Water Conservation District; and Madison County Board of Commissioners

MADISON COUNTY is located in the north-central mountains of western North Carolina, about 260 miles west of Raleigh, the State Capital (fig. 1). It consists of 288,843 acres, or approximately 452 square miles, of very steep mountains, rolling intermountain hills, and narrow valleys. Elevation ranges from 1,240 feet above sea level on the French Broad River at the Tennessee State line to 5,152 feet at Sandymush Bald, near the Madison, Haywood, and Buncombe County lines.

The county is in the southern Blue Ridge Mountain Physiographic Province (MLRA 130B). It is bordered on the east by Yancey County, on the south by Buncombe County, and on the west by Haywood County. It is bordered on the north by Cocke, Greene, and Unicoi Counties, Tennessee. According to the U.S. Census Bureau, the county had a population of 19,635 in 2000 and will have an estimated population of 22,129 by 2010. In 2000, the county seat of Marshall had a population of 840. Populations in the towns of Hot Springs and Mars Hill were 642 and 1,834, respectively.

This soil survey updates the survey of Madison County published in 1942 *(16)*. It provides additional information and has larger maps, which show the soils in greater detail.

General Nature of the Survey Area

This section gives general information about Madison County *(14)*. It describes history and development; economic development; physiography, relief, and drainage; and climate.

History and Development

The Madison County Chamber of Commerce, the Rural Life Museum, and the Southern Appalachian Center on the campus of Mars Hill College helped prepare this section.

The survey area, which is part of the French Broad River Valley, was home to the

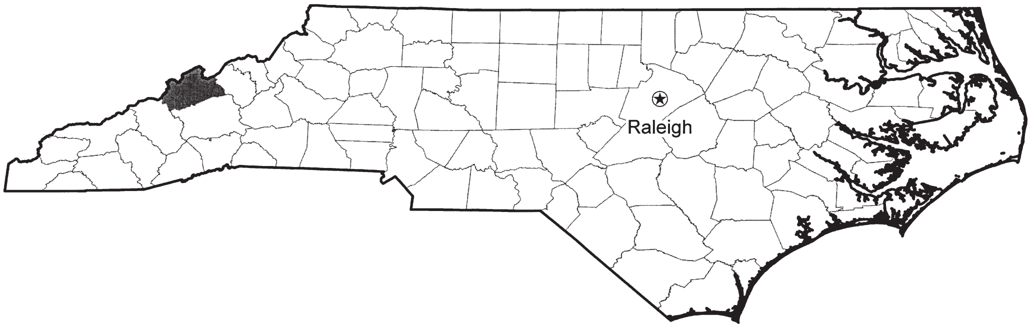

Figure 1.—Location of Madison County in North Carolina.

Cherokee and Catawba Indians, who used it primarily as a hunting ground and for trading purposes. Early explorers included Daniel Boone, French botanist Andre Michaux, English botanist John Fraser, and Dr. Asa Gray, the "Father of American Botany."

The first European settlers arrived in the mid 1700's. Most of these settlers were Scotch-Irish and English. Due to the rugged mountains and lack of roads, the early settlers of the French Broad River Valley lived in virtual isolation. The earliest settlement was in the Hot Springs area and was named for the natural hot mineral springs.

Beginning in the 1790's, the wagon trail along the French Broad River was the primary trade route through the Southern Appalachian Mountains. In 1824, the North Carolina General Assembly created the Buncombe Turnpike Corporation to build a toll road to relieve congestion on the old wagon trail. In 1828, the Turnpike was completed, connecting Tennessee and Kentucky to the East Coast. It was the superhighway of the South and served as the route by which farm products were carried to the markets in Charleston, South Carolina, and Augusta, Georgia. The area, however, remained relatively inaccessible until after the Civil War and the arrival of the railroad.

Along the Turnpike, farmers, or drovers, herded thousands of hogs, cattle, horses, mules, turkeys, and other livestock. Livestock could only travel a few miles a day, so it was necessary to establish stock stands at close intervals along the route to corral and feed the stock. Owners of the stands arranged with local farmers for their grain to feed the stock. On their return from the markets, drovers brought needed goods to pay their livestock feed bill. An enormous quantity of grain was needed to feed stock at the Turnpike stands, and this demand changed the local countryside. Surrounding farms cleared large areas of mountain woodland and converted it to cropland to grow grain.

In 1851, Madison County was created from part of Buncombe and Yancey Counties. In the same year, Marshall became the county seat. The county is named in honor of James Madison, the fourth President of the United States (from 1809 to 1817). The county seat of Marshall, originally called Lapland, was named for U.S. Chief Justice John Marshall.

In 1882, the Western North Carolina Railroad Company, bought by the Southern Railroad in 1894, completed the rail link from Asheville to Painted Rock along the French Broad River. This was the first railroad through the southern part of the Appalachian Mountains. This railroad ended the era of the livestock drives and the Buncombe Turnpike. Until the railroad penetrated the valley, Madison County was mostly inaccessible to the rest of the world. The railroad opened up new opportunities for mountain people, and their lifestyles began to change.

The railroad also allowed for rapid extraction of timber and encouraged the development of a tourism industry. Logging extended into the most remote coves with the help of the railroad. The Laurel River Logging Company, for example, bought large tracts of land, built a railroad line into the Laurel Watershed, and cut timber for their mill on the French Broad River at Runion.

Tourism has played a significant role in the history and development of Madison County. Hot Springs, a tourist destination since the early 1800's, has been renowned for its healing mineral water and scenic mountain setting. By the mid 1880's, the hot mineral springs (110 degrees F) supported one of the most elegant resorts in the country. The resort consisted of large hotels, riding stables, and a bath house with marble pools. It was surrounded by landscaped lawns with croquet and tennis courts, and it established the first organized golf club in the Southeast.

Hot Springs became known as a fashionable tourist resort with many of the Nation's wealthiest visiting the area. By 1917, fewer people visited the area and the hotel was leased to the federal government as an internment camp during World War I. When war was declared hundreds of German merchant sailors captured in U.S. harbors were housed on the resort grounds. In 1920, the hotel burned and the area never regained its former glory. Since the 1980's, outdoor recreation has flourished throughout the county and Hot Springs is again a relaxing mountain retreat.

Following a population decline after World War II, Madison County has grown slowly since the mid 1960's. Several factors have contributed to this growth. Economic opportunities in the form of light industry and providing goods and services in support of the tourist industry have reduced out-migration by the local population. Construction is also providing an increasing number of jobs. Madison County offers a high quality of life, and entrepreneurs are moving to the area to start small businesses. Many retirees, having built summer homes in the past, are permanently settling here.

Economic Development

Initially, Madison County had a subsistence-based agricultural economy. Toward the end of the 19th century the railroad opened up the area to large-scale timber operations. By the late 1920's and early 1930's, most of the marketable timber was cut and the chestnut blight closed out the era of the timber baron. The lumber business as a major industry came to an end.

Today, the county has a mixed industrial and agricultural economy. Because 211,345 acres, or 73 percent of the county, is in woodland, forest products are also an important industry. The growing conditions in the county are conducive to the production of quality hardwoods. In 2002, according to the Madison Chamber of Commerce and North Carolina Agricultural Statistics, income from forest products was $6,181,000. The light industrial base also includes electronics, packaging, and several small textile plants. In 2002, approximately 22 percent of the workforce was in manufacturing, 12 percent in construction, 52 percent in services, and 14 percent in agriculture.

In 2002, according to the North Carolina Department of Agriculture, the county had 973 farms covering 84,053 acres. There were 30,993 acres of cropland and 9,879 acres of harvested cropland. In 2004, cash receipts totaled $19,603,000. The major agricultural products are burley tobacco, hay, and beef cattle. Specialty crops, such as vegetables, fruits, berries, and apples, and trout are also raised. Also on the increase are goats for dairy and meat production. Burley tobacco is grown on most farms and supplements the income of many factory workers. The production of Christmas trees and native ornamentals has grown in recent years. Organic farming has continued to increase, providing a variety of fresher, locally grown products for grocers, community-supported agriculture, restaurants, and tailgate markets. Generally, farms are small, are specialized, and grow a high-value crop.

The town and college of Mars Hill are closely knit together. As the college has grown, so has the town. The need for a school in eastern Madison County led local families to establish the French Broad Baptist Institute. The school was started in the fall of 1856 and later renamed Mars Hill College. The town was incorporated in 1893. Mars Hill College is the oldest educational institution still on its original site in western North Carolina. In 1960, plans were approved for converting the school into a senior college. Mars Hill remains a college town and is still an important factor in the total economy of the community.

Tourism and its related businesses are becoming vital parts of the economy. The 55,360 acres of Pisgah National Forest, managed by the U.S. Forest Service, is a hub for much of this activity. Agri-tourism is a growing business which packages mountain excursions complete with u-pick, teaching farms, and mountain folk culture. Also, second-home construction and the mountain arts and crafts tradition contribute greatly to the economic development of Madison County.

Physiography, Relief, and Drainage

Madison County is in the southern Blue Ridge Mountain Physiographic Province. The physiography of the county consists of high, intermediate, and low mountains; intermountain hills; coves; terraces; and flood plains. Elevation ranges from 1,240 feet above sea level on the French Broad River at the Tennessee State line to 5,152 feet at Sandymush Bald, near the Madison, Haywood, and Buncombe County lines.

The high mountain landscape is above about 4,600 feet in elevation. It has steep or very steep soils on side slopes, gently sloping to steep soils on ridgetops, and moderately steep or steep soils in coves. The well drained soils are shallow to very deep to hard or weathered bedrock. The clay content of the subsoil is low. The surface layers are thick and have a very high content of organic matter. Surface stones and boulders are common. In places rock outcrops occur. This landscape is subject to very cold temperatures and windswept conditions. High mountains are confined to the northwest and southwest portions of the county. Max Patch Mountain and Sandymush Bald are examples.

The intermediate mountain landscape ranges from 3,500 to 4,800 feet in elevation. It is the most extensive landscape in the county. It has moderately steep to very steep soils on side slopes and gently sloping to steep soils on ridgetops. These soils are shallow to very deep to hard or weathered bedrock and are well drained or somewhat excessively drained. Very deep, moderately steep or steep, well drained soils are in coves and in drainageways where surface stones and boulders are common. In general, the clay content in the subsoil is low at the higher elevations and medium at the lower elevations. The soils on cool aspects, in coves, and in drainageways have thick surface layers that have a high content of organic matter. In places rock outcrops occur. Intermediate mountains occur throughout the county. Rich Mountain, Duckett Top, Bluff Mountain, and Big Knob are examples.

The low mountain landscape ranges from 2,400 to 3,500 feet in elevation. It has moderately steep to very steep soils on side slopes and gently sloping to strongly sloping soils on ridgetops. The soils are shallow to very deep to weathered bedrock and are well drained or somewhat excessively drained. Very deep, strongly sloping to steep, well drained soils are in coves and in drainageways. In general, the clay content of the subsoil is medium or high. The soils on ridgetops commonly contain more clay than those on side slopes. In coves, soils are very deep, gently sloping to moderately steep, and well drained. The soils on cool aspects, in coves, and in drainageways have thick surface layers that have a high content of organic matter. Low mountains occur throughout the county and are commonly extensions of larger mountain ranges, such as the Walnut, Newfound, Bald, or Spring Creek Mountains. They also occur within the intermountain hills landscape.

The intermountain hills landscape ranges from 1,500 to 2,600 feet in elevation. It has strongly sloping to steep soils on side slopes and gently sloping to strongly sloping soils on ridgetops. Soils are moderately deep to very deep to weathered bedrock. Soil surfaces are thin or eroded and have a low content of organic matter. Clay content of the subsoil is medium or high. Soils on the ridgetops commonly contain more clay than soils on the side slopes. In coves, soils are very deep, gently sloping to moderately steep, and well drained. Surface layers, where uneroded, are medium or more thick in thickness, commonly contain rock fragments, and have a moderate or high content of organic matter. The clay content of the subsoil is medium or high. The intermountain hills occur mostly along Little Ivy Creek, Gabriel Creek, California Creek, and Brush Creek; in and around White Rock, Marshall, Mars Hill, and Hot Springs; and up Meadow Fork Creek toward Joe.

Terraces have nearly level to strongly sloping soils, are narrow, and occur parallel to the streams. Soils are very deep, and the clay content of the subsoil is high. Surface layers, where uneroded, are medium or more more in thickness, commonly contain rock fragments, and have a moderate or high content of organic matter. Many terraces occur in the Hot Springs area and the Spring Creek, Shelton Laurel, and Mars Hill communities. Generally, terraces occur above larger flood plains of intermountain hills and low mountain areas.

Flood plains have nearly level soils which run parallel to the stream channel. In general, soils next to major streams and rivers and in the lower end of watersheds are well drained to somewhat poorly drained and are moderately deep to very deep to gravelly strata. The Beech-Glen, Spring Creek, and Hot Springs areas are examples. The upper end of watersheds are moderately well drained and shallow or moderately deep to gravelly strata. The Joe, Trust, and Luck areas are examples. Along the smaller streams and branches, soils are moderately well drained or somewhat poorly drained and moderately deep to gravelly strata. Doe Branch and upper Walnut Creek are examples. Poorly drained soils occur on broader flood plains throughout the county. In general, the clay content of the subsoil is low but ranges to medium on lesser streams and at the lower end of watersheds. The surface layers, where they have not been scoured by flooding, are medium or more in thickness and have a moderate or high content of organic matter.

Madison County is drained in the east by the Ivy River and Big Laurel Creek. Both originate in the Walnut Mountain Range in the eastern part of the county. The west is drained by Spring, Big Pine, and Sandymush Creeks. These creeks originate in the Newfound and Spring Creek Mountains in the western part of the county. Drainage is to the north. The Ivy River and Big Laurel, Spring, Big Pine, and Sandymush Creeks flow into the French Broad River. The French Broad River continues northwest through the river gorge into Cocke County, Tennessee, and eventually into Douglas Lake.

The Ivy River Watershed flows southwest, where it joins the French Broad River near Rollins, southeast of Marshall. Major drainage areas in the western half that are below forks of the Ivy River are Bull Creek, Whiteoak Creek, and Gabriel Creek. Above the forks in the eastern half are Little Ivy, Holcombe Branch, California Creek, Middle Fork, and Paint Fork.

The north-central part of the county drains southwest and into the Big Laurel Creek, where it joins the French Broad River at Runion. Major drainage areas in the western half are Big Hurricane Creek, Little Hurricane Creek, Little Laurel Creek, Shelton Laurel Creek, Hickey Fork, and Big Creek. Major drainage areas in the eastern half are Spill Corn Creek, Foster Creek, and Puncheon Fork.

In the Big Pine Creek Watershed, major drainage areas of the northern half are Rector Branch, Baker Branch, Levi Branch, and Puncheon Camp Branch. Major drainage of the southern half is Sugarcamp Branch, Indian Camp Branch, Back Branch, North Fork, and South Fork. Big Pine Creek flows northeast, where it joins the French Broad River near Walnut at Barnard.

The Spring Creek Watershed flows northeast, where it joins the French Broad River in the town of Hot Springs. Major drainage areas are Meadow Fork, Roaring Fork, Little Creek, Long Branch, Sugar Camp Branch, Sliding Knob Branch, and Friezeland Creek.

In the Sandymush Watershed, major drainage areas east of Canto are Simmons Branch and Worley Cove. Major drainage areas west of Canto are Little Sandymush, Morrow Branch, Barrett Branch, Fall Branch, Doggett Branch, and Gilbert Branch. Sandymush Creek flows northeast along the Buncombe County line until it joins the French Broad River just south of Bailey Bend.

In the central part of the county, the Walnut Creek and Brush Creek Watersheds flow southwest and the Little Pine Creek Watershed flows northeast. Major drainage of the Walnut Creek Watershed is Ammons Branch, Big Branch, Bee Branch, West Branch, Heck Creek, and Hunter Creek. Major drainage of the Brush Creek Watershed is McDevitt Branch and Rice Branch. Major drainage of Little Pine Creek Watershed is Caney Fork, Roberts Branch, and Rough Branch. These watersheds all join the French Broad River between Redmon Dam and Barnard.

Climate

In Madison County, the climate of the mountains differs greatly from that of the intermountain hills and flood plains. Climate and the weather are influenced by elevation, aspect, and wind direction, which is predominantly from the west. Rainfall increases as elevation increases, and temperature decreases. Temperatures are cooler on north- to east-facing aspects. Daily temperatures can fluctuate widely, with cold or warm spells possible year-round. There is a chance of frost in the high mountains during the summer months.

Precipitation is generally evenly distributed throughout the year. Summer precipitation falls chiefly during thunderstorms. Heavy rains from prolonged storms occasionally cover the entire area (or individual watersheds) and cause severe flooding in valleys. Several inches of moisture are added to the soil by fog condensing on trees and flowing down the trunk at higher elevations in summer. In winter, precipitation in valleys is chiefly rain with occasional snow. In the mountains, especially along the North Carolina-Tennessee State line and above 4,000 feet in elevation, precipitation is chiefly snow, although rains are frequent. Ice storms and rime ice occur on high mountains and on prominent ridgetops and upper side slopes of intermediate mountains (fig. 2). In Madison County snow cover does not persist except at high elevations and on northerly aspects.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Marshall, North Carolina, in the period 1971 to 2000. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on the length of the growing season. For additional climatic information to go http://www.wcc.nrcs.usda.gov/climate/.

In winter, the average temperature is 37.4 degrees F and the average daily minimum temperature is 26.3 degrees. The lowest temperature on record, which occurred at Marshall on January 21, 1985, was -21 degrees. In summer, the average temperature is 71.3 degrees and the average daily maximum temperature is 82.9 degrees. The highest temperature, which occurred at Marshall on July 29, 1952, was 102.0 degrees.

Growing degree days are shown in table 1. They are equivalent to “heat units.” During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall. Slow air drainage allows frost pockets to form in late spring and early fall in nearly level or gently sloping areas that are low on the landscape. These areas have a shorter growing season than the county average.

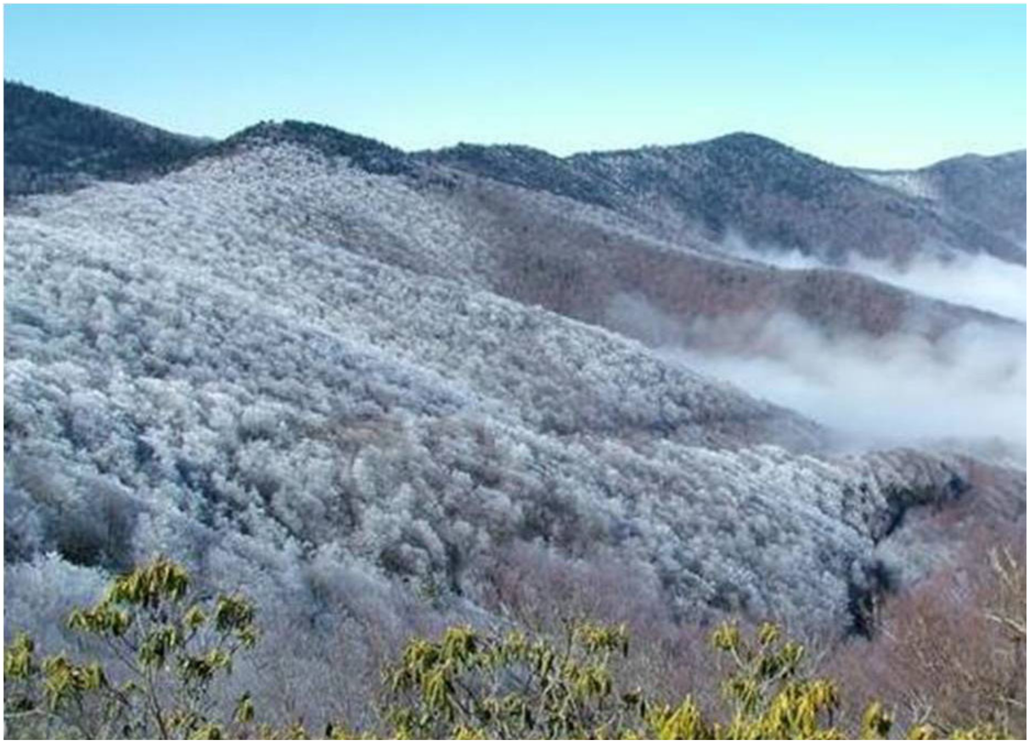

Figure. 2—Rime ice occurs on high mountains and on ridgetops and upper side slopes of prominent intermediate mountains.

Annual precipitation varies throughout the county. Because of prevailing weather patterns, generally moving west to east, more precipitation is deposited near the Tennessee State line and higher mountains. This results in a typical rain shadow in the south-central portion of the county. Average rainfall ranges from 35 to 40 inches in the Marshall area to more than 58 inches on Max Patch Mountain. Estimated annual rainfall is 50 to 58 inches along the North Carolina-Tennessee State line in the northeast and northwest parts of the county and 42 to 50 inches from the Shelton Laurel Creek area northeast to the Bald Mountain area. The lowest average annual precipitation in North Carolina occurs between Marshall, Mars Hill, and the Buncombe County line. This area is in a rain shadow and annually receives 35 to 38 inches of rain.

The average annual precipitation at Marshall is 40.26 inches. Of this, 20.75 inches, or about 52 percent, usually falls in May through September. The growing season for most crops falls within this period.

The heaviest 1-day rainfall during the period of record was 3.92 inches, recorded at Marshall on April 5, 1957. Thunderstorms occur on about 45 days each year, and most occur between May and August.

The average seasonal snowfall is 14.0 inches. The greatest snow depth at any one time during the period of record was 22 inches, recorded on March 14, 1993. On an average, 10 days per year have at least 1 inch of snow on the ground. The heaviest 1-day snowfall on record was 13 inches, recorded on March 13, 1993.

The average relative humidity in mid-afternoon is about 58 percent. Humidity is higher at night, and the average at dawn is about 90 percent. Where air drainage is slow, near seeps and springs and along flowing water, average daytime relative humidity is higher. The sun shines 58 percent of the time possible in summer and 57 percent in winter. The prevailing wind is highly dependent on location in this mountainous county. Valleys, however, channel the wind flow in all directions throughout the year. Average windspeed is highest, around 9 miles per hour, in the winter and early spring months. High mountain ridgetops and side slopes and prominent intermediate mountain ridgetops are windswept. Sustained winds over 25 miles per hour are common.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-geology-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

A soil boundary or map unit delineation designates the landform and slope on which a soil occurs. Landform (position) is the three-dimensional part of the land surface and has a distinctive shape. Examples include flood plain, cove, side slope, and ridgetop. The slope (steepness) is given as a range, such as 15 to 30 percent (fig. 3). All or part of the slope range may exist within a delineation.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify the soils. After describing the soils and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research *(4)*.

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. The data from

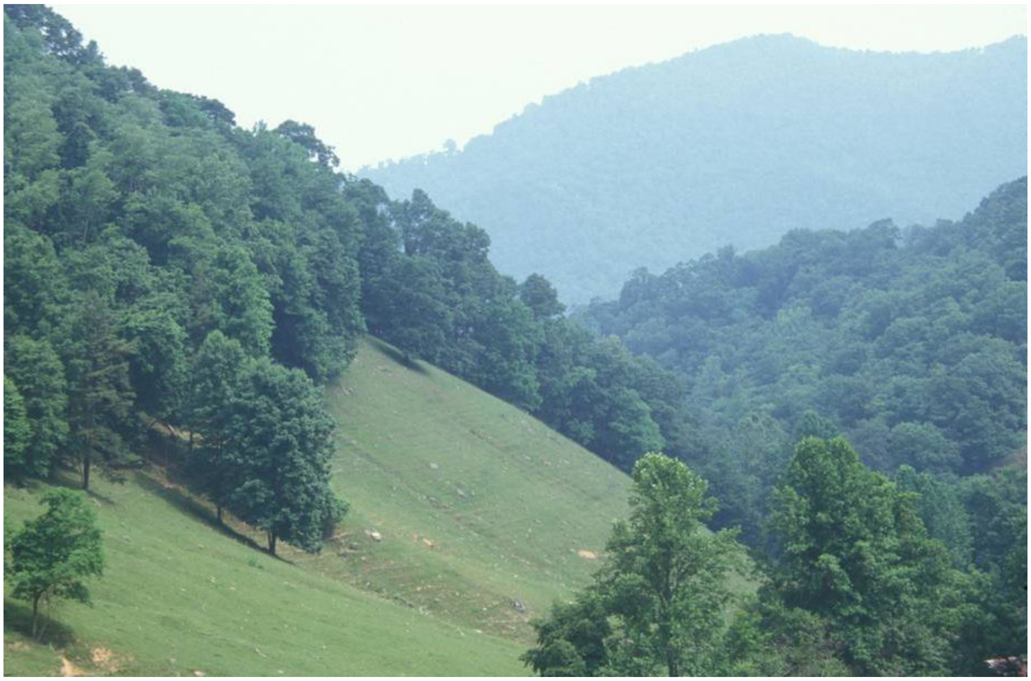

Figure 3.—An example of steep mountain side slopes ranging from 30 to 50 percent.

these analyses and tests and from field-observed characteristics and soil properties are used to predict behavior of the soils under different uses *(4)*.

Interpretations are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a relatively high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in accurately locating boundaries.

Survey Procedures

The general procedures followed in making this survey are described in the “National Soil Survey Handbook” of the Natural Resources Conservation Service and in the “Soil Survey Manual” *(17, 21)*.

Before fieldwork began, preliminary boundaries of slopes and landforms were plotted stereoscopically on leaf off aerial photographs taken in March of 1985 at a scale of 1:12,000. United States Geological Survey geologic and topographic maps at a scale of 1:24,000 were also used. Map units were then designed according to the pattern of soils interpreted from photographs, maps, and field observations.

Traverses in the valleys were made by truck or on foot. The soils were examined at intervals ranging from a few hundred feet to about 1/4 mile, depending on the landscape and soil pattern. Observations of special features, such as landforms, vegetation, and evidence of flooding, were made continuously without regard to spacing. Soil boundaries were determined on the basis of soil examinations, observations, and photo interpretations. In many areas, such as those where very steep slopes intersect with flood plains, these boundaries are precise because of an abrupt change in the landform. The soils were examined with the aid of a hand probe, a bucket auger, or a spade to a depth of about 3 to 5 feet. The typical pedons were observed in pits dug by hand or with a back hoe.

Traverses in the mountainous areas were made by truck or on foot along the existing network of roads and trials. These traverses commonly were made a few miles apart where the geologic materials and landscapes were uniform. In areas where differences in geologic material or landscape were observed, traverses were made at intervals close enough for the soil scientists to observe any differences among the soils. Examinations were made at intervals ranging from a few hundred feet to about 1/4 mile. Observations of landforms and vegetation were made continuously without regard to spacing. Where soil profiles were readily observable, such as along recently constructed access roads and along logging roads, observations of the content of rock fragments, depth to bedrock, depth of rooting, the landform, and the underlying material were made without regard to spacing. Soil boundaries were plotted stereoscopically on the basis of parent material, landform, and relief. Many of these boundaries cannot be exact because they fall within a zone of gradual change between landforms, such as an area where a mountain ridge becomes a mountainside. Much intermingling of the soils occurs in these zones.

Samples for chemical and physical analyses were taken from the site of the typical pedon of the major soils in the survey area. Most of the analyses were made by the Soil Survey Laboratory, Lincoln, Nebraska. Some soils were analyzed by the North Carolina State University Soils Laboratory, Raleigh, North Carolina. Commonly used laboratory procedures were followed *(18)*. (See http://soils.usda.gov/survey/nscd/.)

After completion of the soil mapping on un-rectified aerial photographs, map unit delineations and surface drainage were transferred by hand. Cultural features were transferred from 7.5-minute topographic maps of the United States Geological Survey. Soil survey data was compiled and digitized onto orthophotographs at a scale of 1:12,000 (1 inch equals 1,000 feet). The finished soil survey for Madison County, North Carolina, is posted online. (See http://websoilsurvey.nrcs.usda.gov/app/.)

General Soil Map Units

The general soil map shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The components of one map unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Detailed Soil Map Units

The map units delineated on the detailed maps represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses. More information about each map unit is given under the heading “Use and Management of the Soils.”

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soil. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units these latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit and thus do not affect use and management. These are called non-contrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect us or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soils maps because of the scale used in mapping. The inclusions of contrasting soils are identified in the map unit descriptions. A few may not have been observed and consequently are not mentioned in the descriptions, especially when the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase

Figure 4.—This survey is designed for many different land uses, including agriculture, forestry, and housing. Soil properties and site features that affect land use are identified, and management measures are offered for consideration.

commonly indicates a feature that affects use or management. For example, Clifton clay loam, 8 to 15 percent slopes, moderately eroded, is a phase of the Clifton series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes. A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Mars Hill-Walnut complex, 30 to 50 percent slopes, stony, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. The Rock outcrop part of the Unaka-Rock outcrop complex, 50 to 95 percent slopes, very bouldery, is an example.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas

Soil Survey as a Land Management Tool

The purpose of this soil survey is not to prescribe (dictate) specific methods for overcoming limitations but to point out or flag soil properties and site features so they can be addressed by land managers and users (fig. 4). In the following detailed map unit descriptions, these properties and features are referred to as management concerns. Management measures are options or reference points to consider for a given use.

Soil interpretations and limitations are based on the potential risk that soil properties and site features pose for a given use. During the survey these were referenced by field observations, by laboratory analysis, and through contact with local land use professionals. Updating soil interpretations is a dynamic process. As more information is collected and land management practices are developed or modified, interpretations and suitabilities may be revised.

Site-specific features should also be considered. An onsite investigation may be necessary to determine if any or all of the management concerns affect the use in question or if the management measures are relative. The goals of the land manager or user and the resources available to them then determine the suitability (favorability) of any soil map unit for a given use.

Soil Interpretations and Suitability Ratings

A suitability rating identifies the degree the soils in a map unit are favorable for a given use within the survey area.

Well suited.—The soils have properties favorable for the use. There are no soil limitations although inclusions of limiting, dissimilar soils or site features may be present. Good soil performance and low maintenance can be expected. Vegetation or other attributes can easily be maintained, improved, or established.

Suited.—The soils are moderately favorable for the use. One or more soil properties make these soils less desirable than those rated well suited. Vegetation or other attributes can be maintained, improved, or established but a more intensive management effort is needed to maintain the resource base.

Poorly suited.—The soils have one or more soil properties that are unfavorable for the use. Overcoming the unfavorable property requires special design, extra maintenance, or costly alteration. Vegetation or other attributes are difficult to establish or maintain.

Unsuited.—The expected performance of the soils is unacceptable, and the use generally should not be undertaken.

AcD—Ashe-Cleveland-Rock outcrop complex, 15 to 30 percent slopes, very stony

Setting

Landscape: Low and intermediate mountains throughout the county
Elevation range: 1,700 to 4,500 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow
Size of areas: As much as 21 acres

Composition

Ashe soil and similar inclusions: 40 percent
Cleveland soil and similar inclusions: 30 percent
Rock outcrop: 20 percent
Dissimilar inclusions: 10 percent

Typical Profile

Ashe

Surface layer:
0 to 5 inches—very dark grayish brown sandy loam

Subsoil:
5 to 25 inches—strong brown sandy loam

Underlying material:
25 to 30 inches—yellowish brown gravelly sandy loam saprolite

Bedrock:
30 to 80 inches—unweathered, hard biotite gneiss

Cleveland

Surface layer:
0 to 5 inches—dark brown sandy loam

Subsoil:
5 to 14 inches—dark yellowish brown sandy loam

Bedrock:
14 to 80 inches—unweathered, hard biotite gneiss

Rock outcrop

This part of the map unit consists of outcrops of predominantly granite and biotite gneiss bedrock.

Properties and Qualities of the Ashe and Cleveland Soils

Depth class: Ashe—moderately deep; Cleveland—shallow
Drainage class: Somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Ashe—low; Cleveland—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Ashe—20 to 40 inches to hard bedrock; Cleveland—10 to 20 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contact

Minor Components

Dissimilar inclusions:

- Random areas of Buladean and Edneyville soils that have soft bedrock at a depth of 40 to more than 60 inches
- Soils that have hard bedrock at a depth of 1 to 10 inches; adjacent to rock outcrops
- Random areas of soils that have more mica in the subsoil than the Ashe and Cleveland soils and have hard bedrock at a depth of more than 40 inches
- Random areas of soils on slopes of less than 15 percent or more than 30 percent
- Areas of rubble land below rock outcrops and in drainageways
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Ashe and Cleveland soils that have coarse sandy loam, fine sandy loam, and loam surface textures
- Random areas of Chestnut soils that have soft bedrock at a depth of 20 to 40 inches

Land Use

Dominant Uses: Wildlife habitat
Other Uses: Recreation and pasture

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very stony surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management concerns: Equipment use, erodibility, rooting depth, droughtiness, and soil fertility
Management measures and considerations:
- This map unit is difficult to manage for pasture and hay production because of the slope, erodibility, extent of rock outcrops, and the very stony surface. A site should be selected on better suited soils.
- The slope limits equipment use in the steeper areas.
- Because of the low available water capacity and the moderately deep and shallow rooting depth, this map unit is difficult to manage for the production of pasture and hay crops.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned clipping and harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, extent of rock outcrops, and the very stony surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, depth to bedrock, extent of rock outcrops, and the very stony surface. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for dwellings because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very stony surface. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for septic tanks because of the slope, depth to bedrock, extent of rock outcrops, and the very stony surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very stony surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very stony surface. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: Ashe—VIs; Cleveland—VIIs; Rock outcrop—VIIIs

ArE—Ashe-Cleveland-Rock outcrop complex, 30 to 50 percent slopes, very bouldery

Setting

Landscape: Low and intermediate mountains throughout the county
Elevation range: 1,700 to 4,500 feet
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: As much as 130 acres

Composition

Ashe soil and similar inclusions: 40 percent
Cleveland soil and similar inclusions: 30 percent
Rock outcrop: 20 percent
Dissimilar inclusions: 10 percent

Typical Profile

Ashe

Surface layer:
0 to 5 inches—very dark grayish brown sandy loam

Subsoil:
5 to 25 inches—strong brown sandy loam

Underlying material:
25 to 30 inches—yellowish brown gravelly sandy loam saprolite

Bedrock:
30 to 80 inches—unweathered, hard biotite gneiss

Cleveland

Surface layer:
0 to 5 inches—dark brown sandy loam

Subsoil:
5 to 14 inches—dark yellowish brown sandy loam

Bedrock:
14 to 80 inches—unweathered, hard biotite gneiss

Rock outcrop

This part of the map unit consists of outcrops of predominantly granite and biotite gneiss bedrock.

Properties and Qualities of the Ashe and Cleveland Soils

Depth class: Ashe—moderately deep; Cleveland—shallow
Drainage class: Somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Ashe—low; Cleveland—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Ashe—medium; Cleveland—high
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Ashe—20 to 40 inches to hard bedrock; Cleveland—10 to 20 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contact; soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Random areas of Buladean and Edneyville soils that have soft bedrock at a depth of 40 to more than 60 inches
- Soils that have hard bedrock at a depth of 1 to 10 inches; adjacent to rock outcrops
- Toecane and Tusquitee soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways, below rock outcrops, and on benches and toeslopes
- Random areas of soils that have more mica in the subsoil than the Ashe and Cleveland soils and have hard bedrock at a depth of more than 40 inches
- Random areas of soils on slopes of less than 30 percent or more than 50 percent
- Areas of rubble land below rock outcrops and in drainageways
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Ashe and Cleveland soils that have coarse sandy loam, fine sandy loam, and loam surface textures
- Random areas of Chestnut soils that have soft bedrock at a depth of 20 to 40 inches

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management measures and considerations:
- This map unit is difficult to manage for pasture and hay production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of the slope,

erodibility, low productivity, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tanks because of the slope, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: Ashe and Cleveland—VIIe; Rock outcrop—VIIIs

ArF—Ashe-Cleveland-Rock outcrop complex, 50 to 95 percent slopes, very bouldery

Setting

Landscape: Low and intermediate mountains throughout the county
Elevation range: 1,700 to 4,500 feet
Landform: South- to west-facing mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: As much as 189 acres

Composition

Ashe soil and similar inclusions: 40 percent
Cleveland soil and similar inclusions: 30 percent
Rock outcrop: 20 percent
Dissimilar inclusions: 10 percent

Typical Profile

Ashe

Surface layer:
0 to 5 inches—very dark grayish brown sandy loam

Subsoil:
5 to 25 inches—strong brown sandy loam

Underlying material:
25 to 30 inches—yellowish brown gravelly sandy loam saprolite

Bedrock:
30 to 80 inches—unweathered, hard biotite gneiss

Cleveland

Surface layer:
0 to 5 inches—dark brown sandy loam

Subsoil:
5 to 14 inches—dark yellowish brown sandy loam

Bedrock:
14 to 80 inches—unweathered, hard biotite gneiss

Rock outcrop

This part of the map unit consists of outcrops of predominantly granite and biotite gneiss bedrock.

Properties and Qualities of the Ashe and Cleveland Soils

Depth class: Ashe—moderately deep; Cleveland—shallow
Drainage class: Somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Ashe—low; Cleveland—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Ashe—medium; Cleveland—high
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Ashe—20 to 40 inches to hard bedrock; Cleveland—10 to 20 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contact; soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Random areas of Buladean and Edneyville soils that have soft bedrock at a depth of 40 to more than 60 inches
- Soils that have hard bedrock at a depth of 1 to 10 inches; adjacent to rock outcrops
- Toecane and Tusquitee soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways, below rock outcrops, and on benches and toeslopes
- Random areas of soils that have more mica in the subsoil than the Ashe and Cleveland soils and have hard bedrock at a depth of more than 40 inches
- Random areas of soils on slopes of less than 50 percent or more than 95 percent
- Areas of rubble land below rock outcrops and in drainageways
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Ashe and Cleveland soils that have coarse sandy loam, fine sandy loam, and loam surface textures
- Random areas of Chestnut soils that have soft bedrock at a depth of 20 to 40 inches

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for pasture and hay production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of the slope,

erodibility, low productivity, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tanks because of the slope, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: Ashe and Cleveland—VIIs; Rock outcrop—VIIIs

BaA—Biltmore loamy sand, 0 to 3 percent slopes, occasionally flooded

Setting

Landscape: Mountain valleys; dominantly along Ivy, Shelton Laurel, and Spring Creeks and the French Broad River
Elevation range: 1,250 to 2,250 feet
Landform: Flood plains
Landform position: Planar to slightly convex bottomland slopes
Shape of areas: Long and narrow
Size of areas: As much as 44 acres

Composition

Biltmore soil and similar inclusions: 90 percent
Dissimilar inclusions: 10 percent

Typical Profile

Surface layer:
0 to 8 inches—dark yellowish brown loamy sand

Underlying material:
8 to 80 inches—dark yellowish brown sand that has mottles in shades of brown

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Sandy
Permeability: Rapid
Available water capacity: Very low
Depth to seasonal high water table: 3.5 to 6.0 feet from December through May and 4.0 to 6.5 feet from June through November
Hazard of flooding: Occasional; throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Nearly level or gently sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: None to slight
Organic matter content of surface layer: Low
Potential frost action: Low
Special climatic conditions: Soil subject to slow air drainage, which allows late spring and early fall frost
Soil reaction: Strongly acid to slightly alkaline throughout the profile
Parent material: Recent sandy alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Soil subject to scouring and deposition during flooding

Minor Components

Dissimilar inclusions:
- Soils that have a frequent flooding hazard; on low-lying landscapes
- Rosman soils that have loamy subsoils and an occasional flooding hazard; in slightly higher-lying positions
- Moderately well drained Dellwood and Reddies soils that are loamy in the upper part and have strata with a high content of rock fragments at a depth of 8 to 40 inches; along stream channels
- Areas of soils on slopes of more than 3 percent slopes; along stream channels and toeslopes
- Soils that are moderately well drained to poorly drained; in depressions, old stream channels, and backwater areas

Similar inclusions:
- Biltmore soils that have sandy loam and loam surface textures

Land Use

Dominant Uses: Woodland, wildlife habitat, and recreation
Other Uses: Pasture and hayland

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns: Flooding, droughtiness, soil fertility, nutrient leaching, climate, and equipment use
Management measures and considerations:

- Because of the potential for flooding during the growing season, this soil is difficult to manage for cropland.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Flooding, droughtiness, soil fertility, and nutrient leaching
Management measures and considerations:

- Although most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- Using drought-tolerant plants helps to increase productivity.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using split applications of lime, fertilizer, and pesticides helps to increase their effectiveness.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for orchard and ornamental crops because of the frequent flooding. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods
Suitability: Poorly suited
Management concerns: Flooding and seedling survival
Management measures and considerations:

- This soil is difficult to manage for timber production because of the frequent flooding hazard.
- The potential for flooding should be a consideration in the placement of haul roads and log landings.
- Planting the appropriate species, as recommended by a forester, helps to achieve maximum productivity and helps to ensure planting success.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:

- This soil is severely limited for dwellings because of the flooding. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This soil is severely limited for septic tank absorption fields because of the flooding and poor filtering capacity. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This soil is severely limited for roads and streets because of the flooding. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Flooding, high sand content, droughtiness, soil fertility, nutrient leaching, and climate
Management measures and considerations:
- Because of the flooding, this soil is difficult to manage.
- Quick and permanent establishment of ground cover helps to stabilize the soil and improves trafficability.
- This soil has a low available water capacity and becomes droughty during periods of low rainfall.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Using split applications of lime, fertilizer, and pesticides helps to increase their effectiveness.
- Using frequent and light applications of irrigation water helps to prevent the leaching of plant nutrients and pesticides below the rooting zone.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: IIIs

BkB2—Braddock clay loam, 2 to 8 percent slopes, moderately eroded

Setting

Landscape: Low mountains; dominantly in the Hot Springs, Mars Hill, and Spring Creek areas
Elevation range: 1,350 to 2,600 feet
Landform: High stream terraces
Landform position: Benches
Shape of areas: Long and narrow or irregular
Size of areas: As much as 8 acres

Composition

Braddock soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 11 inches—dark brown clay loam

Subsoil:
11 to 57 inches—red clay
57 to 80 inches—loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Moderate
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Moderate; about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, which allows late spring and early fall frost
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Old alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: High cotnent of clay in the subsoil; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Tate soils that have thicker surface layers with more organic matter and have less clay in the subsoil; in concave areas
- Moderately well drained to poorly drained soils in depressions and on toeslopes
- Somewhat poorly drained French soils that are loamy in the upper part and have strata with a high content of rock fragments; along stream channels
- Random areas of soils on slopes of more than 8 percent
- Udorthents, loamy, in and around the towns of Hot Springs and Mars Hill
- Udorthents-Urban land in and around the towns of Hot Springs and Mars Hill

Similar inclusions:
- Braddock soils that have loam and sandy clay loam surface textures

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Erodibility, tilth, root penetration, pesticide retention, soil fertility, and climate
Management measures and considerations:

- Using resource management systems that include contour farming, conservation tillage, crop residue management, stripcropping, winter cover crops, and crop rotations that include grasses and legumes helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Chisel plowing and subsoiling helps to break through clay pans, which allows increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, root penetration, pesticide retention, and soil fertility
Management measures and considerations:

- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- Using perennial grasses and legumes helps to penetrate and break up the clayey root zone
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Orchards—well suited; ornamentals—suited
Management concerns: Erodibility, root disease, climate, ball and burlap harvesting, pesticide retention, and soil fertility
Management measures and considerations:

- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Due to the restricted movement of air and water caused by the high content of clay of the subsoil, phytophthora root disease severely limits the production of Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent fracture or deformation of the ball and the tearing of plant roots.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Woodland Management and Productivity

Potential for commercial species: Very high for eastern white pine and moderately high for cove hardwoods
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not be grazed in areas managed for woodland.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Well suited
Management concerns: Erodibility, high clay content, shrink-swell potential, corrosivity, seeps and springs, and large stones
Management measures and considerations:

- Vegetating cleared and graded areas as soon as possible and using erosion-control

structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- The soil is slippery and sticky when wet and slow to dry.
- Reinforcing foundations and footings or backfilling with coarse textured material helps to strengthen buildings and prevents the damage caused by shrinking and swelling.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Excavations may unearth large stones.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, high clay content, seeps and springs, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Excavations may unearth large stones.

Local roads and streets

Suitability: Well suited
Management concerns: Low strength, high clay content, erodibility, frost action, and seeps and springs
Management measures and considerations:
- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric, filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- The soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible helps to prevent slippage and excessive soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases soil strength, allows for year-round use, and helps to reduce the damage from frost heave.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.

Lawns and landscaping

Suitability: Suited
Management concerns: Erodibility, high clay content, soil compaction, root disease, pesticide retention, climate, and soil fertility

Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- The soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high content of clay of the subsoil, phytophthora root disease severely limits the production of Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to landscape plants.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.

Interpretive Group

Land capability classification: IIe

BkC2—Braddock clay loam, 8 to 15 percent slopes, moderately eroded

Setting

Landscape: Low mountains; dominantly in the Hot Springs, Mars Hill, and Spring Creek areas
Elevation range: 1,350 to 2,600 feet
Landform: High stream terraces
Landform position: Benches
Shape of areas: Irregular
Size of areas: As much as 32 acres

Composition

Braddock soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 11 inches—dark brown clay loam

Subsoil:
11 to 57 inches—red clay
57 to 80 inches—red loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Moderate
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Moderate; about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, which allows late spring and early fall frost
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Old alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: High content of clay in the subsoil; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:

- Tate soils that have thicker surface layers with more organic matter and have less clay in the subsoil; in concave areas
- Moderately well drained to poorly drained soils in depressions and on toeslopes
- Somewhat poorly drained French soils that are loamy in the upper part and have strata with a high content of rock fragments at a depth of 20 to 40 inches; along stream channels
- The residual Clifton and Evard soils on the edge of map units
- Random areas of soils on slopes of less than 8 percent or more than 15 percent
- Udorthents, loamy, in and around the towns of Hot Springs and Mars Hill
- Udorthents-Urban land in and around the towns of Hot Springs and Mars Hill

Similar inclusions:

- Braddock soils that have loam and sandy clay loam surface textures

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Erodibility, equipment use, tilth, root penetration, pesticide retention, soil fertility, and climate
Management measures and considerations:

- Using conservation practices, such as contour farming, winter cover crops, and crop

rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit equipment use in the steeper areas.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Chisel plowing and subsoiling helps to break through clay pans, which allows increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, equipment use, root penetration, pesticide retention, and soil fertility
Management measures and considerations:
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- The slope may limit equipment use in the steeper areas when harvesting hay crops.
- Using perennial grasses and legumes helps to penetrate and break up the clayey root zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Orchards—well suited; ornamentals—suited
Management concerns: Erodibility, equipment use, root disease, climate, ball and burlap harvesting, pesticide retention, and soil fertility
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit equipment use in the steeper areas.

- Due to the restricted movement of air and water caused by the high content of clay of the subsoil, phytophthora root disease severely limits the production of Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent fracture or deformation of the ball and tearing of plant roots.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Woodland Management and Productivity

Potential for commercial species: Very high for eastern white pine and moderately high for cove hardwoods
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not be grazed in areas managed for woodland.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Erodibility, slope, shrink-swell potential, high clay content, corrosivity, seeps and springs, and large stones
Management measures and considerations:

- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Designing structures so that they conform with natural slopes helps to improve soil performance.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- The soil is slippery and sticky when wet and slow to dry.
- Reinforcing foundations and footings or backfilling with coarse textured material

helps to strengthen buildings and prevents the damage caused by shrinking and swelling.

- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Excavations may unearth large stones and boulders.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, high clay content, slope, seeps and springs, and large stones
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Excavations may unearth large stones and boulders.

Local roads and streets

Suitability: Suited
Management concerns: Low strength, high clay content, slope, erodibility, frost action, and seeps and springs
Management measures and considerations:

- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.
- Using a nondegradeable permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- The soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible helps to prevent slippage and excessive soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases soil strength, allows for year-round use, and helps to reduce the damage from frost heave.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.

Lawns and landscaping

Suitability: Suited
Management concerns: Erodibility, slope, high clay content, soil compaction, root disease, pesticide retention, climate, and soil fertility
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control

structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- The soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high content of clay of the subsoil, phytophthora root disease severely limits the production of Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to landscape plants.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.

Interpretive Group

Land capability classification: IIIe

BkD2—Braddock clay loam, 15 to 30 percent slopes, moderately eroded

Setting

Landscape: Low mountains; dominantly in the Hot Springs, Mars Hill, and Spring Creek areas
Elevation range: 1,350 to 2,600 feet
Landform: High stream terraces
Landform position: Benches
Shape of areas: Irregular
Size of areas: As much as 18 acres

Composition

Braddock soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 11 inches—dark brown clay loam

Subsoil:
11 to 57 inches—red clay
57 to 80 inches—loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained

General texture class: Clayey
Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Moderate
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Moderate; about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, which allows late spring and early fall frost
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Old alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: High content of clay in the subsoil; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Tate soils that have thicker surface layers with more organic matter and have less clay in the subsoil; in concave areas
- Moderately well drained to poorly drained soils in depressions and on toeslopes
- The residual Clifton and Evard soils on the edge of map units
- Random areas of soils on slopes of more than 30 percent slopes
- Udorthents, loamy, in and around the towns of Hot Springs and Mars Hill
- Udorthents-Urban land in and around the towns of Hot Springs and Mars Hill

Similar inclusions:
- Braddock soils that have loam and sandy clay loam surface textures

Land Use

Dominant Uses: Pasture and hayland
Other Uses: Cropland and building site development

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Equipment use, erodibility, tilth, root penetration, pesticide retention, soil fertility, and climate
Management measures and considerations:
- This soil is difficult to manage for cultivated crops because the slope limits equipment use.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.

- Chisel plowing and subsoiling helps to break through clay pans, which allows increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Pasture and hayland

Suitability: Suited
Management concerns: Equipment use, erodibility, root penetration, pesticide retention, and soil fertility
Management measures and considerations:

- The slope limits equipment use in the steeper areas.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Suited
Management concerns: Equipment use, erodibility, root disease, climate, ball and burlap harvesting, pesticide retention, and soil fertility
Management measures and considerations:

- This soil may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Due to the restricted movement of air and water caused by the high content of clay of the subsoil, phytophthora root disease severely limits the production of Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent fracture or deformation of the ball and tearing of plant roots.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Woodland Management and Productivity

Potential for commercial species: Very high for eastern white pine and moderately high for cove hardwoods
Suitability: Suited
Management concerns: Erodibility and equipment use
Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not be grazed in areas managed for woodland.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, shrink-swell potential, high clay content, corrosivity, seeps and springs, and large stones
Management measures and considerations:

- Designing structures so that they conform with natural slopes helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- The soil is slippery and sticky when wet and slow to dry.
- Reinforcing foundations and footings or backfilling with coarse textured material helps to strengthen buildings and prevents the damage caused by shrinking and swelling.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.

- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Excavations may unearth large stones and boulders.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope, restricted permeability, high clay content, seeps and springs, and large stones
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Excavations may unearth large stones and boulders.

Local roads and streets

Suitability: Poorly suited
Management concerns: Low strength, high clay content, slope, erodibility, frost action, and seeps and springs
Management measures and considerations:

- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.
- Using a nondegradeable permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- The soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes is difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases soil strength, allows for year-round use, and helps to reduce the damage from frost heave.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, climate, and soil fertility
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- The soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high content of clay

of the subsoil, phytophthora root disease severely limits the production of Fraser fir and other susceptible ornamentals.

- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to landscape plants.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.

Interpretive Group

Land capability classification: IVe

BnD—Buladean-Chestnut complex, 15 to 30 percent slopes, stony

Setting

Landscape: Low and intermediate mountains; dominantly in the western and eastern parts of the county
Elevation range: 2,000 to 4,800 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow or irregular
Size of areas: As much as 180 acres

Composition

Buladean soil and similar inclusions: 50 percent
Chestnut soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Buladean

Surface layer:
0 to 3 inches—dark yellowish brown loam

Subsoil:
3 to 26 inches—yellowish brown loam

Underlying material:
26 to 50 inches—yellowish brown coarse sandy loam saprolite

Bedrock:
50 to 80 inches—weathered, biotite gneiss

Chestnut

Surface layer:
0 to 2 inches—dark brown loam

Subsoil:
2 to 27 inches—dark yellowish brown loam

Bedrock:
27 to 80 inches—weathered biotite gneiss

Soil Properties and Qualities

Depth class: Buladean—deep; Chestnut—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Buladean—moderate; Chestnut—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum weathered from felsic or mafic, high-grade metamorphic or igneous rock
Depth to bedrock: Buladean—40 to 60 inches to soft bedrock; Chestnut—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Cowee and brown soils that have more clay in the subsoil than the Buladean and Chestnut soils and have soft bedrock at a depth of 20 to 40 inches; on shoulder slopes and nose slopes
- Evard and brown soils that have more clay in the subsoil than the Buladean and Chestnut soils and have soft bedrock at a depth of more than 60 inches; on shoulder slopes and nose slopes
- Random areas of Edneyville soils that have bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil than the Buladean and Chestnut soils and have soft bedrock at a depth of 40 to more than 60 inches
- Tate soils that have thicker surface layers with more organic matter in the surface layer, have more clay in the subsoil, and have bedrock at a depth of more than 60 inches; in saddles and gaps
- Widely scattered areas of rock outcrop on narrow ridges
- Cleveland and Ashe soils that have hard bedrock at a depth of 10 to 40 inches; adjacent to rock outcrops
- Random areas of soils on slopes of less than 15 percent or more than 30 percent
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Buladean and Chestnut soils that have coarse sandy loam, sandy loam, and fine sandy loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture, hayland, building site development, recreation, and ornamental crops

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Suited
Management concerns: Buladean—equipment use, erodibility, soil fertility, and rooting depth; Chestnut—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Chestnut soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Buladean—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, and rooting depth; Chestnut—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent fracture of the ball and separation of the soil from the roots caused by low moisture and minimal clay content.
- The slope affects the shape of ornamentals on the uphill side.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard and the moderately deep rooting depth, areas of the Chestnut soil are difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderately high for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Buladean—equipment use and erodibility; Chestnut—equipment use, erodibility, and windthrow hazard
Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Chestnut soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:

- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials for foundations and basements helps to reduce the risk of damage to concrete.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Buladean soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, slippage, erodibility, depth to bedrock, and frost action
Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.

- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- The soft bedrock underlying the soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Buladean—slope, erodibility, soil fertility, and depth to bedrock; Chestnut—slope, erodibility, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Chestnut soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock needs to be removed.

Interpretive Group

Land capability classification: IVe

BnE—Buladean-Chestnut complex, 30 to 50 percent slopes, stony

Setting

Landscape: Low and intermediate mountains; dominantly in the western and eastern parts of the county
Elevation range: 2,200 to 4,800 feet
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: As much as 379 acres

Composition

Buladean soil and similar inclusions: 50 percent
Chestnut soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Buladean

Surface layer:
0 to 3 inches—dark yellowish brown loam

Subsoil:
3 to 26 inches—yellowish brown loam

Underlying material:
26 to 50 inches—yellowish brown coarse sandy loam saprolite

Bedrock:
50 to 80 inches—weathered, biotite gneiss

Chestnut

Surface layer:
0 to 2 inches—dark brown loam

Subsoil:
2 to 27 inches—dark yellowish brown loam

Bedrock:
27 to 80 inches—weathered biotite gneiss

Soil Properties and Qualities

Depth class: Buladean—deep; Chestnut—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Buladean—moderate; Chestnut—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic, high-grade metamorphic or igneous rock
Depth to bedrock: Buladean—40 to 60 inches to soft bedrock; Chestnut—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Cowee and browner soils that have more clay in the subsoil than the Buladean and Chestnut soils and have soft bedrock at a depth of 20 to 40 inches; on nose slopes and spur ridges
- Evard and browner soils that have more clay in the subsoil than the Buladean and Chestnut soils and have soft bedrock at a depth of more than 60 inches
- Random areas of Edneyville soils that have bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil than the Buladean and Chestnut soils and have soft bedrock at a depth of 40 to more than 60 inches
- Porters and Unaka soils that have thicker surface layers with more organic matter; at higher elevations and on north- to east-facing side slopes

- Tate and Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Widely scattered areas of rock outcrop
- Cleveland and Ashe soils that have hard bedrock at a depth of 10 to 40 inches; adjacent to rock outcrops
- Random areas of soils on slopes of less than 30 percent or more than 50 percent
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Buladean and Chestnut soils that have coarse sandy loam, sandy loam, and fine sandy loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture, building site development, recreation, and ornamental crops

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management concerns: Buladean—equipment use, erodibility, soil fertility, and rooting depth; Chestnut—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- Because of the slope, this map unit is difficult to manage for pasture or hayland.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Chestnut soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Buladean—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, and rooting depth; Chestnut—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.

- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent fracture of the ball and separation of the soil from the roots caused by low moisture and minimal clay content.
- The slope affects the shape of ornamentals on the uphill side.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard and the moderately deep rooting depth, areas of the Chestnut soil are difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderately high for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Buladean—equipment use and erodibility; Chestnut—equipment use, erodibility, and windthrow hazard
Management measures and considerations:

- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Chestnut soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:

- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials for foundations and basements helps to reduce the risk of damage to concrete.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Buladean soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, slippage, erodibility, depth to bedrock, and frost action
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Buladean—slope, erodibility, soil fertility, and depth to bedrock; Chestnut—slope, erodibility, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Chestnut soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock needs to be removed.

Interpretive Group

Land capability classification: VIe

BnF—Buladean-Chestnut complex, 50 to 95 percent slopes, stony

Setting

Landscape: Low and intermediate mountains; dominantly in the western and eastern parts of the county

Elevation range: 2,000 to 4,800 feet
Landform: South- to west-facing mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: As much as 636 acres

Composition

Buladean soil and similar inclusions: 50 percent
Chestnut soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Buladean

Surface layer:
0 to 3 inches—dark yellowish brown loam

Subsoil:
3 to 26 inches—yellowish brown loam

Underlying material:
26 to 50 inches—yellowish brown coarse sandy loam saprolite

Bedrock:
50 to 80 inches—weathered, biotite gneiss

Chestnut

Surface layer:
0 to 2 inches—dark brown loam

Subsoil:
2 to 27 inches—dark yellowish brown loam

Bedrock:
27 to 80 inches—weathered biotite gneiss

Soil Properties and Qualities

Depth class: Buladean—deep; Chestnut—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Buladean—moderate; Chestnut—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Medium
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic, high-grade metamorphic or igneous rock

Depth to bedrock: Buladean—40 to 60 inches to soft bedrock; Chestnut—20 to 40 inches to soft bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:

- Cowee and browner soils that have more clay in the subsoil than the Buladean and Chestnut soils and have soft bedrock at a depth of 20 to 40 inches; on nose slopes and spur ridges
- Evard and browner soils that have more clay in the subsoil than the Buladean and Chestnut soils and have soft bedrock at a depth of more than 60 inches
- Random areas of Edneyville soils that have bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil than the Buladean and Chestnut soils and have soft bedrock at a depth of 40 to more than 60 inches
- Porters and Unaka soils that have thicker surface layers with more organic matter; at higher elevations and on north- to east-facing side slopes
- Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Widely scattered areas of rock outcrop
- Cleveland and Ashe soils that have hard bedrock at a depth of 10 to 40 inches; adjacent to rock outcrops
- Random areas of soils on slopes of less than 50 or more than 95 percent
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:

- Buladean and Chestnut soils that have coarse sandy loam, sandy loam, and fine sandy loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderately high for upland hardwoods and high for eastern white pine
Suitability: Poorly suited
Management concerns: Buladean—equipment use and erodibility; Chestnut—equipment use, erodibility, and windthrow hazard
Management measures and considerations:
- Using cable logging methods helps to overcome equipment limitations and prevents the acceleration of erosion caused by road construction, skid trails, and disturbance of the forest floor by heavy machinery.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Chestnut soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope and depth to bedrock. Contact the local Health Department for additional guidance.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: VIIe

CaD—Calvin channery silt loam, 15 to 30 percent slopes

Setting

Landscape: Intermountain hills in the Lower Shut-in Creek, Antioch, and Shaleville parts of the county
Elevation range: 1,400 to 1,800 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow
Size of areas: As much as 59 acres

Composition

Calvin soil and similar inclusions: 75 percent
Dissimilar inclusions: 25 percent

Typical Profile

Surface layer:
0 to 8 inches—reddish brown channery silt loam

Subsoil:
8 to 17 inches—reddish brown channery silt loam
17 to 26 inches—reddish brown very channery silt loam

Underlying material:
26 to 35 inches—reddish brown extremely channery silt loam saprolite

Bedrock:
35 to 80 inches—weathered siltstone

Soil Properties and Qualities

Depth class: Moderately deep
Drainage class: Well drained
General texture class: Loamy with many rock fragments
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe or very severe
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Very strongly acid or strongly acid throughout the profile
Parent material: Residuum weathered from sedimentary rock
Depth to bedrock: 20 to 40 inches to hard bedrock
Other distinctive properties: Soil subject to downslope movement when lateral support is removed and to differential settling when used as fill material; high content of rock fragments

Minor Components

Dissimilar inclusions:
- Random areas of Stecoah soils that have soft bedrock at a depth of 40 to 60 inches
- Maymead soils that have fewer rock fragments in the subsoil than the Calvin soil and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and in saddles and gaps
- Random areas of soils on slopes of less than 15 percent or more than 30 percent

Similar inclusions:
- Calvin soils that have sandy loam and loam surface textures

Land Use

Dominant Uses: Woodland, wildlife habitat, and pasture
Other Uses: Building site development and cropland

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, high content of rock fragments, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Equipment use, rooting depth, droughtiness, erodibility, and soil fertility
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Because of the low available water capacity, the moderately deep rooting depth, and the high content of rock fragments, the soil is difficult to manage for the production of pasture and hay crops.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, high content of rock fragments, and depth to bedrock. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Low for upland hardwoods and high for eastern white pine
Suitability: Poorly suited
Management concerns: Equipment use, erodibility, and windthrow hazard
Management measures and considerations:
- The underlying bedrock may be susceptible to mass movement. An onsite

investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of the soil, revegetating cut and fill slopes can be difficult.
- Extensive shaping and grading is needed if roads are to be constructed on the contour.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited due to the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Depth to bedrock, slope, erodibility, corrosivity, slippage, and differential settling
Management measures and considerations:

- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Drilling of rock or special earthmoving equipment is needed to increase the depth of the soil.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of the soil, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Depth to bedrock, slope, and poor filtering capacity
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- This map unit is difficult to manage for septic tank absorption fields due to the high content of rock fragments and moderate depth to bedrock.
- Measures that improve the filtering capacity should be considered; the soil readily absorbs but does not adequately filter effluent.

Local roads and streets

Suitability: Poorly suited
Management concerns: Depth to bedrock, slope, erodibility, slippage, differential settling, and frost action
Management measures and considerations:

- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.

- Extensive shaping and grading is needed if roads are to be constructed on the contour.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of the soil, revegetating cut and fill slopes can be difficult.
- This soil is subject to uneven settling and may be unstable if not properly compacted.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, depth to bedrock, droughtiness, and soil fertility
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the moderately deep rooting depth, this soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- This soil is limited for lawns and landscaping because of the high amount of rock fragments in the root zone.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- This soil has a low available water capacity and becomes droughty during periods of low rainfall.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: IVe

CaE—Calvin channery silt loam, 30 to 50 percent slopes

Setting

Landscape: Intermountain hills in the Lower Shut-in Creek, Antioch, and Shaleville parts of the county
Elevation range: 1,400 to 1,800 feet
Landform: Ridges and hillslopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow or irregular
Size of areas: As much as 38 acres

Composition

Calvin soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 8 inches—reddish brown channery silt loam

Subsoil:
8 to 17 inches—reddish brown channery silt loam
17 to 26 inches—reddish brown very channery silt loam

Underlying material:
26 to 35 inches—reddish brown extremely channery silt loam saprolite

Bedrock:
35 to 80 inches—weathered siltstone

Soil Properties and Qualities

Depth class: Moderately deep
Drainage class: Well drained
General texture class: Loamy with many rock fragments
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Medium
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe or very severe
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Very strongly acid or strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from sedimentary rock
Depth to bedrock: 20 to 40 inches to hard bedrock
Other distinctive properties: Soil subject to downslope movement when lateral support is removed and to differential settling when used as fill material; a high content of rock fragments

Minor Components

Dissimilar inclusions:
- Random areas of Stecoah soils that have soft bedrock at a depth of 40 to 60 inches
- Northcove soils that have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Maymead soils that have fewer rock fragments in the subsoil than the Calvin soil and have bedrock at a depth of more than 60 inches; on toeslopes, on benches, in concave areas at the head of drains, and in saddles and gaps
- Random areas of soils on slopes of less than 30 percent or more than 50 percent
- Widely scattered areas of rock outcrop
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Calvin soils that have fine sandy loam and loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture and building site development

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, high content of rock fragments, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Equipment use, rooting depth, droughtiness, erodibility, and soil fertility
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Because of the low available water capacity, the moderately deep rooting depth, and the high content of rock fragments, this soil is difficult to manage for the production of pasture and hay crops.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, high content of rock fragments, and depth to bedrock. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Low for upland hardwoods and high for eastern white pine
Suitability: Poorly suited
Management concerns: Equipment use, erodibility, and windthrow hazard
Management measures and considerations:
- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.
- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of the soil, revegetating cut and fill slopes can be difficult.

- Extensive shaping and grading is needed if roads are to be constructed on the contour.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited due to the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Depth to bedrock, slope, erodibility, corrosivity, slippage, and differential settling
Management measures and considerations:

- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Drilling of rock or special earthmoving equipment is needed to increase the soil depth.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of the soil, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- This soil is subject to uneven settling and may be unstable if not properly compacted.

Septic tank absorption fields

Suitability: Unsuited
Management concerns: Depth to bedrock, slope, and poor filtering capacity
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- This map unit is difficult to manage for septic tanks and absorption fields due to the high content of rock fragments and moderate depth to bedrock.
- Measures that improve the filtering capacity should be considered; the soil readily absorbs but does not adequately filter effluent.

Local roads and streets

Suitability: Poorly suited
Management concerns: Depth to bedrock, slope, erodibility, slippage, differential settling, and frost action
Management measures and considerations:

- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.
- Extensive shaping and grading is needed if roads are to be constructed on the contour.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.

- Because of the droughty nature of the soil, revegetating cut and fill slopes can be difficult.
- This soil is subject to uneven settling and may be unstable if not properly compacted.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, depth to bedrock, droughtiness, and soil fertility
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- The high content of rock fragments in the root zone limits lawns and landscaping.
- Because of the moderately deep rooting depth, this soil is difficult to manage for lawns and landscaping especially if the soil has been disturbed.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- This soil has a low available water capacity and becomes droughty during periods of low rainfall.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: VIe

CaF—Calvin channery silt loam, 50 to 95 percent slopes

Setting

Landscape: Intermountain hills in the Lower Shut-in Creek, Antioch, and Shaleville parts of the county
Elevation range: 1,400 to 1,800 feet
Landform: Mountains slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: As much as 74 acres

Composition

Calvin soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 8 inches—reddish brown channery silt loam

Subsoil:
8 to 17 inches—reddish brown channery silt loam
17 to 26 inches—reddish brown very channery silt loam

Underlying material:
26 to 35 inches—reddish brown extremely channery silt loam saprolite

Bedrock:
35 to 80 inches—weathered siltstone

Soil Properties and Qualities

Depth class: Moderately deep
Drainage class: Well drained
General texture class: Loamy with many rock fragments
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Medium
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Very strongly acid or strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from sedimentary rock
Depth to bedrock: 20 to 40 inches to hard bedrock
Other distinctive properties: Soil subject to downslope movement when lateral support is removed and to differential settling when used as fill material; a high content of rock fragments

Minor Components

Dissimilar inclusions:
- Soco and Stecoah soils that have soft bedrock at a depth of 20 to 60 inches; on spur ridges
- Northcove soils that have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Maymead soils that have fewer rock fragments in the subsoil than the Calvin soil and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains
- Random areas of soils on slopes of less than 50 percent or more than 95 percent
- Random areas of soils that have hard bedrock at a depth of less than 20 inches
- Widely scattered areas of rock outcrop
- Random areas where landslides have occurred

Similar inclusions:
- Calvin soils that have sandy loam and loam surface textures

Land Use

Dominant Uses: Wildlife habitat
Other Uses: Woodland and pasture

Agricultural Development

Cropland

Suitability: Unsuited

Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, high content of rock fragments, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for pasture and hay production because of the slope, erodibility, high content of rock fragments, and depth to bedrock. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, high content of rock fragments, and depth to bedrock. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of the slope, low productivity, and depth to bedrock. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, high content of rock fragments, and depth to bedrock. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tanks because of the slope, erodibility, high content of rock fragments, and depth to bedrock. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, high content of rock fragments, and depth to bedrock. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope,

erodibility, high content of rock fragments, and depth to bedrock. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: VIIe

CfF—Cataska-Sylco-Rock outcrop complex, 50 to 95 percent slopes, very stony

Setting

Landscape: Low and intermediate mountains in the north-central to northeastern parts of the county
Elevation range: 1,300 to 4,000 feet
Landform: South- to west-facing mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: As much as 530 acres

Composition

Cataska soil and similar inclusions: 40 percent
Sylco soil and similar inclusions: 30 percent
Rock outcrop: 20 percent
Dissimilar inclusions: 10 percent

Typical Profile

Cataska

Surface layer:
0 to 4 inches—yellowish brown channery silt loam

Subsoil:
4 to 12 inches—light yellowish brown very channery silt loam

Bedrock:
12 to 28 inches—weathered slate
28 to 80 inches—unweathered, hard slate

Sylco

Surface layer:
0 to 5 inches—dark yellowish brown channery loam

Subsoil:
5 to 23 inches—strong brown very channery loam

Bedrock:
23 to 80 inches—unweathered, hard phyllite

Rock outcrop

This part of the map unit consists of outcrops of predominantly slate and phyllite bedrock.

Properties and Qualities of the Cataska and Sylco Soils

Depth class: Cataska—shallow; Sylco—moderately deep
Drainage class: Cataska—excessively drained; Sylco—somewhat excessively drained
General texture class: Loamy with many rock fragments

Permeability: Cataska—moderately rapid or rapid; Sylco—moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: High
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part of the profile, weathered from low-grade metasedimentary rock
Depth to bedrock: 20 to 40 inches to hard bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material; a high content of rock fragments; water movement along bedrock contacts in areas of the Sylco soil

Minor Components

Dissimilar inclusions:

- Soco and Stecoah soils that have soft bedrock at a depth of 20 to 60 inches; on spur ridges
- Northcove and Maymead soils that have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Junaluska soils that have more clay in the subsoil than the Cataska and Sylco soils and have soft bedrock at a depth of 20 to 40 inches; on spur ridges
- Random areas of soils on slopes of less than 50 percent or more than 95 percent
- Random areas of soils that have hard bedrock at a depth of less than 10 inches
- Areas of rubble land below rock outcrops and in drainageways
- Random areas where landslides have occurred
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:

- Cataska soils that have loam surface textures
- Sylco soils that have silt loam surface textures

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for crop production because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for pasture and hay production because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of the slope, low productivity, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tanks because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: Cataska and Sylco—VIIs; Rock outcrop—VIIIs

ChD—Cheoah-Jeffrey complex, 15 to 30 percent slopes, stony

Setting

Landscape: Intermediate mountains in the northeastern part and in the Sandymush Bald area in the southwestern part of the county
Elevation range: 3,000 to 4,500 feet
Landform: North- to east-facing ridges and those shaded by higher mountains
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow
Size of areas: As much as 55 acres

Composition

Cheoah soil and similar inclusions: 55 percent
Jeffrey soil and similar inclusions: 30 percent
Dissimilar inclusions: 15 percent

Typical Profile

Cheoah

Surface layer:
0 to 12 inches—very dark grayish brown loam

Subsoil:
12 to 38 inches—strong brown to brown loam
38 to 51 inches—strong brown channery loam

Bedrock:
51 to 80 inches—weathered, interbedded metasandstone and phyllite

Jeffrey

Surface layer:
0 to 8 inches—dark grayish brown loam

Subsoil:
8 to 31 inches—dark yellowish brown channery loam

Bedrock:
31 to 80 inches—unweathered, hard, interbedded metasandstone and phyllite

Soil Properties and Qualities

Depth class: Cheoah—deep; Jeffrey—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Cheoah—moderate; Jeffrey—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe

Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to cooler annual air temperatures, which allow late spring and early fall frosts; a higher soil moisture content due to north- to east-facing aspects or shading by higher mountains
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum weathered from low-grade metasedimentary rock
Depth to bedrock: Cheoah—40 to 60 inches to hard bedrock; Jeffrey—20 to 40 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts in areas of the Jeffrey soil

Minor Components

Dissimilar inclusions:
- Random areas of soils that have bedrock at a depth of more than 60 inches
- Ditney and Unicoi soils that have thinner surface layers with less organic matter and have hard bedrock at a depth of 7 to 40 inches; on south- to west-facing shoulder slopes and on nose slopes
- Random areas of soils on slopes of less than 15 percent or more than 30 percent
- Widely scattered areas of rock outcrop on narrow ridges
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Cheoah soils that have sandy loam and fine sandy loam surface textures
- Jeffrey soils that have fine sandy loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation, pasture, and building site development

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Suited
Management concerns: Cheoah—equipment use, erodibility, pesticide retention, soil fertility, and rooting depth; Jeffrey—equipment use, erodibility, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase

the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.

- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Jeffrey soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Cheoah—suited; Jeffrey—poorly suited
Management concerns: Cheoah—equipment use, erodibility, pesticide retention, ball and burlap harvesting, plant shape, climate, soil fertility, and rooting depth; Jeffrey—equipment use, erodibility, pesticide retention, ball and burlap harvesting, plant shape, climate, soil fertility, rooting depth, and droughtiness
Management measures and considerations:

- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Avoiding ball and burlap harvesting during dry periods helps to prevent fracture of the ball and separation of the soil from the roots caused by low moisture and minimal clay content.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the cooler air temperatures associated with the north- to east-facing aspects, there is a potential that late spring frost will damage new growth in some years.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity, windthrow hazard, and the moderately deep rooting depth, areas of the Jeffrey soil are difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and northern hardwoods
Suitability: Suited
Management concerns: Cheoah—erodibility, equipment use, and pesticide retention; Jeffrey—erodibility, equipment use, pesticide retention, and windthrow hazard
Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to slope and the high content of organic matter in the surface layer.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.

- Blasting, shaping, and grading is needed if roads are to be constructed on the contour.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Jeffrey soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Cheoah—slope, depth to bedrock, erodibility, and corrosivity; Jeffrey—slope, depth to bedrock, and erodibility
Management measures and considerations:

- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Drilling and blasting of rock or special earthmoving equipment is needed to increase the depth of these soils.
- Vegetating cleared and graded areas as soon as possible or constructing silt fences helps to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Cheoah soils may improve the performance of the filter field.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, erodibility, depth to bedrock, and frost action
Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Blasting, shaping, and grading is needed if roads are to be constructed on the contour.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Cheoah—slope, erodibility, pesticide retention, soil fertility, climate, and depth to bedrock; Jeffrey—slope, erodibility, pesticide retention, soil fertility, climate, depth to bedrock, and droughtiness
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- These soils may retain soil-applied herbicides and other pesticides due to the high

content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- The use of native, winter-hardy landscape plants is recommended.
- Due to the cooler air temperatures associated with the north- to east-facing aspects of this map unit, there is a potential that late spring frost will damage new growth in some years.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Jeffrey soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Group

Land capability classification: VIe

ChE—Cheoah-Jeffrey complex, 30 to 50 percent slopes, stony

Setting

Landscape: Low and intermediate mountains in the northeastern part and in the Sandymush Bald area in the southwestern part of the county
Elevation range: 3,000 to 4,500 feet
Landform: North- to east-facing ridges and mountain slopes and those shaded by higher mountains
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: As much as 58 acres

Composition

Cheoah soil and similar inclusions: 50 percent
Jeffrey soil and similar inclusions: 35 percent
Dissimilar inclusions: 15 percent

Typical Profile

Cheoah

Surface layer:
0 to 12 inches—very dark grayish brown loam

Subsoil:
12 to 38 inches—strong brown to brown loam
38 to 51 inches—strong brown channery loam

Bedrock:
51 to 80 inches—weathered, interbedded metasandstone and phyllite

Jeffrey

Surface layer:
0 to 8 inches—dark grayish brown loam

Subsoil:
8 to 31 inches—dark yellowish brown channery loam

Bedrock:
31 to 80 inches—unweathered, hard, interbedded metasandstone and phyllite

Soil Properties and Qualities

Depth class: Cheoah—deep; Jeffrey—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Cheoah—moderate; Jeffrey—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to cooler annual air temperatures, which allows late spring and early fall frosts; a higher soil moisture content due to north- to east-facing aspects or shading by higher mountains
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: Cheoah—40 to 60 inches to hard bedrock; Jeffrey—20 to 40 inches to hard bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material; water movement along bedrock contacts in areas of the Jeffrey soil

Minor Components

Dissimilar inclusions:
- Random areas of soils that have bedrock at a depth of more than 60 inches
- Ditney and Unicoi soils that have thinner surface layers with less organic matter and have hard bedrock at a depth of 7 to 40 inches; on south- to west-facing shoulder slopes and on nose slopes
- Soco and Stecoah soils that have thinner surface layers with less organic matter and have soft bedrock at a depth of 20 to 60 inches; on south- to west-facing shoulder slopes and on nose slopes
- Maymead and Northcove soils that have thinner surface layers with less organic matter and have bedrock at a depth of more than 60 inches; in saddles and gaps, concave areas at the head of drains, and drainageways
- Random areas of soils on slopes of less than 30 percent or more than 50 percent
- Widely scattered areas of rock outcrop
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Cheoah soils that have sandy loam and fine sandy loam surface textures
- Jeffrey soils that have fine sandy loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation, pasture, and building site development

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management concerns: Cheoah—equipment use, erodibility, pesticide retention, soil fertility, and rooting depth; Jeffrey—equipment use, erodibility, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- Because of the slope, this map unit is difficult to manage for pasture or hayland.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Jeffrey soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Cheoah—equipment use, erodibility, pesticide retention, ball and burlap harvesting, plant shape, climate, soil fertility, and rooting depth; Jeffrey—equipment use, erodibility, pesticide retention, ball and burlap harvesting, plant shape, climate, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Avoiding ball and burlap harvesting during dry periods helps to prevent fracture of the ball and separation of the soil from the roots caused by low moisture and minimal clay content.
- The slope affects the shape of ornamentals on the uphill side.

- Due to the cooler air temperatures associated with the north- to east-facing aspects of this map unit, there is a potential that late spring frost will damage new growth in some years.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity, windthrow hazard, and moderately deep rooting depth, areas of the Jeffrey soil are difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and northern hardwoods

Suitability: Suited

Management concerns: Cheoah—equipment use, erodibility, and pesticide retention; Jeffrey—equipment use, erodibility, pesticide retention, and windthrow hazard

Management measures and considerations:

- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope and the high content of organic matter in the surface layer.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Blasting, shaping, and grading is needed if roads are to be constructed on the contour.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Jeffrey soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Cheoah—slope, depth to bedrock, erodibility, and corrosivity; Jeffrey—slope, depth to bedrock, and erodibility

Management measures and considerations:

- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Drilling and blasting of rock or special earthmoving equipment is needed to increase the depth of these soils.
- Vegetating cleared and graded areas as soon as possible or constructing silt fences helps to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to bedrock and slope

Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Locating and using areas of the deeper Cheoah soil may improve the performance of filter fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, erodibility, depth to bedrock, frost action, and seeps and springs
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible helps to prevent slippage and excessive soil erosion.
- Blasting, shaping, and grading is needed if roads are to be constructed on the contour.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Cheoah—slope, erodibility, pesticide retention, soil fertility, climate, and depth to bedrock; Jeffrey—slope, erodibility, pesticide retention, soil fertility, climate, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- The use of native, winter-hardy landscape plants is recommended.
- Due to the cooler air temperatures associated with the north- to east-facing aspects of this map unit, there is a potential that late spring frost will damage new growth in some years.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Jeffrey soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Group

Land capability classification: VIIe

ChF—Cheoah-Jeffrey complex, 50 to 95 percent slopes, stony

Setting

Landscape: Low and intermediate mountains in the northeastern part and in the Sandymush Bald area in the southwestern part of the county
Elevation range: 3,000 to 4,500 feet
Landform: North- to east-facing mountain slopes and those shaded by higher mountains
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: As much as 54 acres

Composition

Cheoah soil and similar inclusions: 60 percent
Jeffrey soil and similar inclusions: 30 percent
Dissimilar inclusions: 10 percent

Typical Profile

Cheoah

Surface layer:
0 to 12 inches—very dark grayish brown loam

Subsoil:
12 to 38 inches—strong brown to brown loam
38 to 51 inches—strong brown channery loam

Bedrock:
51 to 80 inches—weathered, interbedded metasandstone and phyllite

Jeffrey

Surface layer:
0 to 8 inches—dark grayish brown loam

Subsoil:
8 to 31 inches—dark yellowish brown channery loam

Bedrock:
31 to 80 inches—unweathered, hard, interbedded metasandstone and phyllite

Soil Properties and Qualities

Depth class: Cheoah—deep; Jeffrey—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Cheoah—moderate; Jeffrey—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Medium
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe

Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to cooler annual air temperatures, which allows late spring and early fall frosts; a higher soil moisture content due to north- to east-facing aspects or shading by higher mountains
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: Cheoah—40 to 60 inches to hard bedrock; Jeffrey—20 to 40 inches to hard bedrock
Other distinctive properties: Soil subject to downslope movement when lateral support is removed and to differential settling when used as fill material; water movement along bedrock contacts in areas of the Jeffrey soil

Minor Components

Dissimilar inclusions:
- Random areas of soils that have bedrock at a depth of more than 60 inches
- Ditney and Unicoi soils that have thinner surface layers with less organic matter and have hard bedrock at a depth of 7 to 40 inches; on south- to west-facing shoulder slopes and on nose slopes
- Soco and Stecoah soils that have thinner surface layers with less organic matter and have soft bedrock at a depth of 20 to 60 inches; on south- to west-facing shoulder slopes and on nose slopes
- Maymead and Northcove soils that have thinner surface layers with less organic matter and have bedrock at a depth of more than 60 inches; in saddles and gaps, concave areas at the head of drains, and drainageways
- Random areas of soils on slopes of less than 50 percent or more than 95 percent
- Widely scattered areas of rock outcrop
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Cheoah soils that have sandy loam and fine sandy loam surface textures
- Jeffrey soils that have fine sandy loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and northern hardwoods
Suitability: Poorly suited
Management concerns: Cheoah—equipment use, erodibility, and pesticide retention; Jeffrey—equipment use, erodibility, pesticide retention, and windthrow hazard
Management measures and considerations:
- Using cable logging methods helps to overcome equipment limitations and prevents the acceleration of erosion caused by road construction, skid trails, and disturbance of the forest floor by heavy machinery.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Jeffrey soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope and depth to bedrock. Contact the local Health Department for additional guidance.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: VIIe

CsD—Chestoa sandy loam, 15 to 30 percent slopes

Setting

Landscape: Intermediate mountains along the Tennessee State line; from Baxter Branch to Bear Creek in the northern part of the county
Elevation range: 3,600 to 4,400 feet
Landform: North- to east-facing ridges and those shaded by higher mountains
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow
Size of areas: As much as 19 acres

Composition

Chestoa soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 13 inches—very dark brown sandy loam

Subsoil:
13 to 26 inches—grayish brown channery sandy loam

Bedrock:
26 to 80 inches—unweathered, hard quartzite

Soil Properties and Qualities

Depth class: Moderately deep
Drainage class: Somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soil subject to cooler annual air temperatures, which allows late spring and early fall frosts; a higher soil moisture content due to north- to east-facing aspects or shading by higher mountains
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum weathered from low-grade metasedimentary rock
Depth to bedrock: 20 to 40 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts; low natural fertility

Minor Components

Dissimilar inclusions:
- Random areas of soils that have bedrock at a depth of more than 40 inches

- Maymead soils that have bedrock at a depth of more than 60 inches; in saddles, gaps, and concave areas at the head of drains
- Random areas of soils on slopes of less than 15 percent or more than 30 percent
- Widely scattered areas of rock outcrop on narrow ridges
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Chestoa soils that have fine sandy loam and loam surface textures

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, and depth to bedrock. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the

slope and depth to bedrock. Contact the local Health Department for additional guidance.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, and and depth to bedrock. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: VIe

CsE—Chestoa sandy loam, 30 to 50 percent slopes

Setting

Landscape: Intermediate mountains along the Tennessee State line; from Baxter Branch to Bear Creek in the northern part of the county
Elevation range: 3,600 to 4,400 feet
Landform: North- to east-facing ridges, mountain slopes, and those slopes shaded by higher mountains
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: As much as 43 acres

Composition

Chestoa soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 13 inches—very dark brown sandy loam

Subsoil:
13 to 26 inches—grayish brown channery sandy loam

Bedrock:
26 to 80 inches—unweathered, hard, quartzite

Soil Properties and Qualities

Depth class: Moderately deep
Drainage class: Somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep

Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soil subject to cooler annual air temperatures, which allows late spring and early fall frosts; a higher soil moisture content due to north- to east-facing aspects or shading by higher mountains
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: 20 to 40 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts; soil subject to downslope movement when lateral support is removed and to differential settling when used as fill material; low natural fertility

Minor Components

Dissimilar inclusions:
- Random areas of soils that have bedrock at a depth of more than 60 inches
- Northcove soils that have more rock fragments in the subsoil than the Chestoa soil and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Maymead soils that have bedrock at a depth of more than 60 inches; in concave areas at the head of drains, in saddles, and in gaps
- Random areas of soils on slopes of less than 30 percent or more than 50 percent
- Widely scattered areas of rock outcrop on narrow ridges
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Chestoa soils that have fine sandy loam and loam surface textures

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the

slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, and depth to bedrock. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for dwellings because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for septic tank absorption fields because of the slope and depth to bedrock. Contact the local Health Department for additional guidance.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for roads and streets because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: VIe

CsF—Chestoa sandy loam, 50 to 95 percent slopes

Setting

Landscape: Intermediate mountains along the Tennessee State line; from Baxter Branch to Bear Creek in the northern part of the county
Elevation range: 3,600 to 4,400 feet
Landform: North- to east-facing mountain slopes and those shaded by higher mountains
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: As much as 16 acres

Composition

Chestoa soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 13 inches—very dark brown sandy loam

Subsoil:
13 to 26 inches—grayish brown channery sandy loam

Bedrock:
26 to 80 inches—unweathered, hard quartzite

Soil Properties and Qualities

Depth class: Moderately deep
Drainage class: Somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Medium
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soil subject to cooler annual air temperatures, which allows late spring and early fall frosts; a higher soil moisture content due to north- to east-facing aspects or shading by higher mountains
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: 20 to 40 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts; soil subject to downslope movement when lateral support is removed and to differential settling when used as fill material; low natural fertility

Minor Components

Dissimilar inclusions:
- Random areas of soils that have bedrock at a depth of more than 40 inches
- Northcove soils that have more rock fragments in the subsoil than the Chestoa soil and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Maymead soils that have bedrock at a depth of more than 60 inches; on toeslopes, on benches, and in concave areas at the head of drains
- Random areas of soils on slopes of less than 50 percent or more than 95 percent
- Widely scattered areas of rock outcrop
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Chestoa soils that have fine sandy loam and loam surface textures

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, and depth to bedrock. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope and depth to bedrock. Contact the local Health Department for additional guidance.

Local roads and streets

Suitability: Unsuited

Management measures and considerations:

- This map unit is severely limited for roads and streets because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: VIIe

CtB2—Clifton clay loam, 2 to 8 percent slopes, moderately eroded

Setting

Landscape: Intermountain hills and low mountains; dominantly in the Mars Hill area of the south-central part of the county
Elevation range: 1,850 to 2,650 feet
Landform: Ridges
Landform position: Summits
Shape of areas: Long and narrow or irregular
Size of areas: As much as 12 acres

Composition

Clifton soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 8 inches—strong brown clay loam

Subsoil:
8 to 55 inches—red clay

Underlying material:
55 to 80 inches—multicolored loam saprolite

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Moderate; about 25 to 75 percent of the original surface layer has been removed

Hazard of water erosion: Severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock with a high content of ferro-magnesium minerals
Depth to bedrock: More than 60 inches
Other distinctive properties: A high content of clay in the subsoil

Minor Components

Dissimilar inclusions:
- Random areas of Cowee and Evard soils that have less clay in the subsoil than the Clifton soil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Fannin soils that have less clay and more mica in the subsoil than the Clifton soil
- Random areas of soils that are similar to the Clifton soil but have soft bedrock at a depth of less than 60 inches
- Random areas of soils on slopes of more than 8 percent
- Random areas of severely eroded soils where underlying material is exposed at the surface

Similar inclusions:
- Clifton soils that have loam and sandy clay loam surface textures
- Random areas that have reaction in the lower part of the subsoil that ranges to neutral

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Building site development, woodland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Erodibility, equipment use, tilth, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- Using resource management systems that include contour farming, conservation tillage, crop residue management, stripcropping, winter cover crops, and crop rotations that include grasses and legumes helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit equipment use in the steeper areas.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increase rainfall infiltration.
- Chisel plowing and subsoiling help to break through clay pans, which allows for increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.

Pasture and hayland

Suitability: Well suited
Management concerns: Equipment use, erodibility, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- The slope may limit equipment use in the steeper areas when harvesting hay crops.
- Preparing seedbeds on the contour when renovating pastures and establishing seedbeds helps to prevent further soil erosion and increases germination.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned clipping and harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.

Orchard and ornamental crops

Suitability: Orchards—well suited; ornamental crops—poorly suited
Management concerns: Erodibility, equipment use, root disease, soil fertility, pesticide retention, and ball and burlap harvesting
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit equipment use in the steeper areas.
- Due to the restricted movement of air and water caused by the high content of clay of the subsoil, phytophthora root disease severely limits the production of Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as toeslopes and footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent fracture or deformation of the ball and tearing of plant roots.

Woodland Management and Productivity

Potential for commercial species: Very high for eastern white pine and moderate for upland hardwoods
Suitability: Well suited
Management concerns: Erodibility, equipment use, seedling survival, and pesticide retention
Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes is difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.
- Planting improved varieties of eastern white pine helps to increase productivity.
- Replanting may be necessary on warm, south- to west-facing slopes because of reduced soil moisture. Planting when the soil is moist for extended periods helps to increase seedling survival.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Well suited
Management concerns: Slope, erodibility, and high clay content
Management measures and considerations:

- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes is difficult.
- The soil is slippery and sticky when wet and slow to dry.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, high clay content, and slope
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Increasing the size of the septic tank absorption field helps to improve its performance.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.

- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

Local roads and streets

Suitability: Well suited
Management concerns: Low strength, high clay content, slope, erodibility, and frost action
Management measures and considerations:

- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric, filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- The soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, helps to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible helps to prevent slippage and excessive soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes is difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases soil strength, allows for year-round use, and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Suited
Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, and soil fertility
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes is difficult.
- The soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high content of clay of the subsoil, phytophthora root disease severely limits the production of Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the clay content, may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Interpretive Group

Land capability classification: IIe

CtC2—Clifton clay loam, 8 to 15 percent slopes, moderately eroded

Setting

Landscape: Intermountain hills and low mountains; dominantly in the Mars Hill area in the south-central part of the county
Elevation range: 1,850 to 2,650 feet
Landform: Ridges, hillslopes, and mountain slopes
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow or irregular
Size of areas: As much as 139 acres

Composition

Clifton soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 8 inches—strong brown clay loam

Subsoil:
8 to 55 inches—red clay

Underlying material:
55 to 80 inches—multicolored loam saprolite

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Moderate; about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock with a high content of ferro-magnesium minerals
Depth to bedrock: More than 60 inches
Other distinctive properties: A high content of clay in the subsoil

Minor Components

Dissimilar inclusions:

- Random areas of Cowee and Evard soils that have less clay in the subsoil than the Clifton soil and have soft bedrock at a depth of 20 to more than 60 inches

- Random areas of Fannin soils that have less clay and more mica in the subsoil than the Clifton soil
- Random areas of soils that are similar to the Clifton soil but have soft bedrock at a depth of less than 60 inches
- Tate soils that have thicker surface layers with more organic matter and have less clay in the subsoil; in concave areas
- Random areas of soils on slopes of less than 8 percent or more than 15 percent
- Random areas of severely eroded soils where underlying material is exposed at the surface

Similar inclusions:
- Clifton soils that have loam and sandy clay loam surface textures
- Random areas that have reaction in the lower part of the subsoil that ranges to neutral

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Building site development, woodland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Erodibility, equipment use, tilth, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit equipment use in the steeper areas.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Chisel plowing and subsoiling helps to break through clay pans, which allows increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, equipment use, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- The slope may limit equipment use in steeper areas when harvesting hay crops.

- Using perennial grasses and legumes helps to penetrate and break up the clayey root zone.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.

Orchard and ornamental crops

Suitability: Orchards—suited; ornamental crops—poorly suited

Management concerns: Erodibility, equipment use, root disease, soil fertility, pesticide retention, and ball and burlap harvesting

Management measures and considerations:

- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit equipment use in the steeper areas.
- Due to the restricted movement of air and water caused by the high content of clay of the subsoil, phytophthora root disease severely limits the production of Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent fracture or deformation of the ball and tearing of plant roots.

Woodland Management and Productivity

Potential for commercial species: Very high for eastern white pine and moderate for upland hardwoods

Suitability: Well suited

Management concerns: Erodibility and equipment use

Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.

- Livestock should not be grazed in areas managed for woodland.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Erodibility, slope, and high clay content
Management measures and considerations:

- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- The soil is slippery and sticky when wet and slow to dry.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, high clay content, and slope
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

Local roads and streets

Suitability: Suited
Management concerns: Low strength, high clay content, slope, erodibility, and frost action
Management measures and considerations:

- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric, filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- The soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases soil strength, allows for year-round use, and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Suited
Management concerns: Erodibility, slope, high clay content, soil compaction, root disease, pesticide retention, and soil fertility

Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- The soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high content of clay of the subsoil, phytophthora root disease severely limits the production of Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Interpretive Group

Land capability classification: IIIe

CtD2—Clifton clay loam, 15 to 30 percent slopes, moderately eroded

Setting

Landscape: Intermountain hills and low mountains; dominantly in the Mars Hill area in the south-central part of the county
Elevation range: 1,850 to 2,650 feet
Landform: Ridges, hillslopes, and mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and oblong or irregular on side slopes
Size of areas: As much as 308 acres

Composition

Clifton soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 8 inches—strong brown clay loam

Subsoil:
8 to 55 inches—red clay

Underlying material:
55 to 80 inches—multicolored loam saprolite

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Moderate; about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock that has a high content of ferro-magnesium minerals
Depth to bedrock: More than 60 inches
Other distinctive properties: A high content of clay in the subsoil

Minor Components

Dissimilar inclusions:

- Random areas of Cowee and Evard soils that have less clay in the subsoil than the Clifton soil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Fannin soils that have less clay and more mica in the subsoil than the Clifton soil
- Random areas of soils that are similar to the Clifton soil but have soft bedrock at a depth of less than 60 inches
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Tate soils that have thicker surface layers with more organic matter and have less clay in the subsoil; in concave areas and drainageways
- Random areas of soils on slopes of less than 15 percent or more than 30 percent

Similar inclusions:

- Clifton soils that have loam and sandy clay loam surface textures
- Random areas that have reaction in the lower part of the subsoil that ranges to neutral

Land Use

Dominant Uses: Pasture and hayland
Other Uses: Woodland, wildlife habitat, building site development, and cropland

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Equipment use, erodibility, tilth, root penetration, soil fertility, and pesticide retention

Management measures and considerations:

- This soil is difficult to manage for cultivated crops because the slope limits equipment use.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Chisel plowing and subsoiling helps to break through clay pans, which allows increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.

Pasture and hayland

Suitability: Suited
Management concerns: Equipment use, erodibility, root penetration, soil fertility, and pesticide retention
Management measures and considerations:

- The slope limits equipment use in the steeper areas.
- Using perennial grasses and legumes helps to penetrate and break up the clayey root zone.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.

Orchard and ornamental crops

Suitability: Orchards—suited; ornamental crops—poorly suited
Management concerns: Equipment use, erodibility, root disease, soil fertility, pesticide retention, and ball and burlap harvesting
Management measures and considerations:

- This soil is difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Due to the restricted movement of air and water caused by the high content of clay

of the subsoil, phytophthora root disease severely limits the production of Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent fracture or deformation of the ball and tearing of plant roots.

Woodland Management and Productivity

Potential for commercial species: Very high for eastern white pine and moderate for upland hardwoods
Suitability: Suited
Management concerns: Erodibility and equipment use
Management measures and considerations:
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not be grazed in areas managed for woodland.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, and high clay content
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- The soil is slippery and sticky when wet and slow to dry.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope, restricted permeability, and high clay content
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.

- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Low strength, high clay content, slope, erodibility, and frost action
Management measures and considerations:

- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric, filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- The soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible helps to prevent slippage and excessive soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases soil strength, allows for year-round use, and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, and soil fertility
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- The soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high content of clay of the subsoil, phytophthora root disease severely limits the production of Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Interpretive Group

Land capability classification: IVe

CtE2—Clifton clay loam, 30 to 50 percent slopes, moderately eroded

Setting

Landscape: Intermountain hills and low mountains; dominantly in the Mars Hill area in the south-central part of the county
Elevation range: 1,850 to 2,650 feet
Landform: Hillslopes and mountain slopes
Landform position: Side slopes
Shape of areas: Oblong or irregular
Size of areas: As much as 106 acres

Composition

Clifton soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 8 inches—strong brown clay loam

Subsoil:
8 to 55 inches—red clay

Underlying material:
55 to 80 inches—multicolored loam saprolite

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Moderate; about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock with a high content of ferro-magnesium minerals
Depth to bedrock: More than 60 inches
Other distinctive properties: A high content of clay in the subsoil

Minor Components

Dissimilar inclusions:
- Random areas of Cowee and Evard soils that have less clay in the subsoil than the Clifton soil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Fannin soils that have less clay and more mica in the subsoil than the Clifton soil
- Random areas of soils that are similar to the Clifton soil but have soft bedrock at a depth of less than 60 inches
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Tate soils that have thicker surface layers with more organic matter and have less clay in the subsoil; in concave areas at the head of drains and on footslopes
- Random areas of soils on slopes of less than 30 percent or more than 50 percent

Similar inclusions:
- Clifton soils that have loam and sandy clay loam surface textures
- Random areas that have reaction in the lower part of the subsoil that ranges to neutral

Land Use

Dominant Uses: Pasture, woodland, and wildlife habitat
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope and erodibility. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management concerns: Equipment use, erodibility, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- Because of the slope, this map unit is difficult to manage for pasture or hayland.
- Special care should be taken when renovating pastures and establishing seedbeds to prevent further soil erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.

Orchard and ornamental crops

Suitability: Poorly suited

Management concerns: Equipment use, erodibility, root disease, soil fertility, pesticide retention, and ball and burlap harvesting

Management measures and considerations:

- This soil is difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Due to the restricted movement of air and water caused by the high content of clay of the subsoil, phytophthora root disease severely limits the production of Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent fracture or deformation of the ball and tearing of plant roots.

Woodland Management and Productivity

Potential for commercial species: Very high for eastern white pine and moderate for upland hardwoods

Suitability: Suited

Management concerns: Equipment use and erodibility

Management measures and considerations:

- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland or pastureland is converted to woodland.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope, erodibility, and high clay content

Management measures and considerations:

- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control

structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- The soil is slippery and sticky when wet and slow to dry.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope, restricted permeability, and high clay content
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Low strength, high clay content, slope, erodibility, and frost action
Management measures and considerations:
- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric, filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- The soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases soil strength, allows for year-round use, and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- The soil is slippery and sticky when wet and slow to dry.
- Due to the restricted movement of air and water caused by the high content of clay of the subsoil, phytophthora root disease severely limits the production of Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high

content of clay. The concentration of pesticides may be damaging to landscape plants.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Interpretive Group

Land capability classification: VIe

CxC—Clifton-Urban land complex, 2 to 15 percent slopes

Setting

Landscape: Intermountain hills and low mountains; dominantly in the Mars Hill area
Elevation range: 1,850 to 2,450 feet
Landform: Ridges, hillslopes, coves, and flood plains
Landform position: Summits, side slopes, footslopes, toeslopes, and bottomland
Shape of areas: Irregular
Size of areas: As much as 60 acres

Composition

Clifton soil and similar inclusions: 50 percent
Urban land: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Clifton

Surface layer:
0 to 8 inches—strong brown clay loam

Subsoil:
8 to 55 inches—red clay

Underlying material:
55 to 80 inches—multicolored loam saprolite

Urban land

Urban land consists of areas where 85 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process of urban development. The original landscape, topography, and, commonly, the drainage pattern have been changed. Runoff is very rapid and increases the flooding hazard in low-lying areas. A typical profile is not given due to the variable nature of the soil. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Properties and Qualities of the Clifton Soil

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Available water capacity: High

Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Nearly level to strongly sloping
Soil slippage potential: None
Extent of erosion: Moderate; about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: A high content of clay in the subsoil

Minor Components

Dissimilar inclusions:

- Random areas of Udorthents, loamy
- Areas that are subject to frequent, occasional, or rare flooding for very brief duration; adjacent to stream channels
- Random areas of short, steep slopes
- Random areas of Cowee and Evard soils that have less clay in the subsoil than the Clifton soil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Fannin soils that have less clay and more mica in the subsoil than the Clifton soil
- Random areas of soils that are similar to the Clifton soil but have soft bedrock at a depth of less than 60 inches
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of soils on slopes of less than 2 percent or more than 15 percent

Similar inclusions:

- Clifton soils that have sandy clay loam surface textures
- Random areas that have reaction in the lower part of the subsoil that ranges to neutral

Land Use

Dominant Uses: Building site development

Agricultural Development

Cropland

- This map unit is not managed for cropland.

Pasture and hayland

- This map unit is not managed for pasture and hayland.

Orchard and ornamental crops

- This map unit is not managed for orchard or ornamental crops.

Woodland Management and Productivity

- This map unit is not managed for timber production.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Slope, erodibility, and high clay content
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- The soil is slippery and sticky when wet and slow to dry.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, high clay content, and slope
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

Local roads and streets

Suitability: Suited
Management concerns: Low strength, high clay content, slope, erodibility, and frost action
Management measures and considerations:
- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric, filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- The soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases soil strength, allows for year-round use, and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Suited
Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.

- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- The soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high content of clay of the subsoil, phytophthora root disease severely limits the production of Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- The soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Interpretive Group

Land capability classification: Clifton—IIIe; Urban land—VIIIs

DeA—Dellwood-Reddies complex, 0 to 3 percent slopes, occasionally flooded

Setting

Landscape: Mountain valleys of low and intermediate mountains throughout the county
Elevation range: 1,300 to 3,200 feet
Landform: Flood plains dominantly at the upper end of mountain valleys
Landform position: Planar to slightly convex bottomland slopes
Shape of areas: Long and narrow
Size of areas: As much as 99 acres

Composition

Dellwood soil and similar inclusions: 60 percent
Reddies soil and similar inclusions: 30 percent
Dissimilar inclusions: 10 percent

Typical Profile

Dellwood

Surface layer:
0 to 8 inches—very dark grayish brown gravelly fine sandy loam
8 to 16 inches—dark brown extremely gravelly sand

Underlying material:
16 to 80 inches—multicolored extremely gravelly coarse sand

Reddies

Surface layer:
0 to 14 inches—very dark grayish brown sandy loam

Subsoil:
14 to 26 inches—dark yellowish brown fine sandy loam

Underlying material:
26 to 80 inches—multicolored very gravelly sand

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Moderately well drained
General texture class: Dellwood—sandy in the upper part and sandy-skeletal in the lower part; Reddies—loamy in the upper part and sandy or sandy-skeletal in the lower part
Permeability: Dellwood—moderately rapid in the surface layer and rapid or very rapid in the underlying material; Reddies—moderately rapid in the surface layer and subsoil and rapid or very rapid in the underlying material
Available water capacity: Very low
Depth to seasonal high water table: Dellwood—2.0 to 4.0 feet from December through May and 2.5 to 4.5 feet from June through November; Reddies—2.0 to 3.5 feet from December through May and 2.5 to 4.5 feet from June through November
Hazard of flooding: Occasional; throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Nearly level or gently sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: None or slight
Organic matter content of surface layer: High
Potential frost action: Dellwood—low; Reddies—moderate
Special climatic conditions: Soils are subject to slow air drainage, which allows late spring and early fall frost
Soil reaction: Very strongly acid to neutral throughout the profile
Parent material: Alluvium derived from felsic or mafic, high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Depth to contrasting material: Dellwood—8 to 20 inches to deposits of cobbles and gravel that are stratified with sandy or loamy material; Reddies—20 to 40 inches to deposits of cobbles and gravel that are stratified with sandy or loamy material
Other distinctive properties: Soils subject to scouring and deposition during flooding

Minor Components

Dissimilar inclusions:
- Soils that are well drained to excessively well drained; in the wider map units and those adjacent to deep stream channels
- Soils that have a rare flooding hazard; on the wider flood plains
- Somewhat poorly drained French and poorly drained Ela soils that have subsoils that are loamy in the upper part and have strata with a high content of rock fragments at a depth of 20 to 40 inches; in depressions, old stream channels, and backwater areas
- Well drained Rosman soils that have strata with a high content of rock fragments at a depth of more than 40 inches; in the slightly higher-lying positions
- Moderately well drained Dillard soils that have more clay and less rock fragments in the subsoil than the Dellwood and Reddies soils; on low stream terraces and toeslopes
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways
- Random areas of soils on slopes of more than 3 percent

Similar inclusions:
- Dellwood and Reddies soils that have sandy loam and loam surface textures

Land Use

Dominant Uses: Cropland and ornamental crops
Other Uses: Pasture, hayland, recreation, woodland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Flooding, droughtiness, pesticide retention, soil fertility, nutrient leaching, and climate
Management measures and considerations:
- The Dellwood soil is limited for crop production because of the high content of rock fragments.
- Although most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- These soils have a low available water capacity and become droughty during periods of low rainfall.
- Conservation tillage, winter cover crops, crop residue management, and crop rotations that include grasses and legumes help to increase the available water capacity and improve soil fertility.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to prevent the leaching of plant nutrients below the rooting zone and into the water table.
- Using frequent and light applications of irrigation water helps to prevent the leaching of plant nutrients below the rooting zone.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- The Dellwood soil is limited for crop production due to the high content of rock fragments.

Pasture and hayland

Suitability: Suited
Management concerns: Flooding, droughtiness, pesticide retention, soil fertility, nutrient leaching, and erodibility
Management measures and considerations:
- Although most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- These soils have a low available water capacity and become droughty during periods of low rainfall.
- Using supplemental irrigation and crop varieties adapted to droughty conditions helps to increase crop production.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase

the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to prevent the leaching of plant nutrients below the rooting zone and into the water table.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.

Orchard and ornamental crops

Suitability for orchards: Unsuited
Suitability for ornamental crops: Dellwood—poorly suited; Reddies—suited
Management concerns: Dellwood—flooding, droughtiness, root disease, climate, soil fertility, nutrient leaching, pesticide retention, and ball and burlap harvesting; Reddies—flooding, droughtiness, root disease, climate, soil fertility, nutrient leaching, and pesticide retention
Management measures and considerations:
- Because of the potential for flooding, these soils are difficult to manage for orchard or ornamental crops.
- These soils have a low available water capacity and become droughty during periods of low rainfall.
- Due to the seasonal high water table and flooding, phytophthora root disease is a potential limitation for Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as toeslopes and drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to prevent the leaching of plant nutrients below the rooting zone and into the water table.
- Using frequent and light applications of irrigation water helps to prevent the leaching of plant nutrients below the rooting zone.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Avoiding ball and burlap harvesting during dry periods helps to prevent fracture of the ball and separation of the soil from the roots caused by low moisture and the minimal clay content of the Reddies soil.
- Ball and burlap harvesting is severely limited in areas of the Dellwood soil due to the high content of rock fragments.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods
Suitability: Well suited
Management concerns: Flooding and pesticide retention
Management measures and considerations:
- The potential for flooding should be a consideration in the placement of haul roads and log landings.

- Soil-applied herbicides are retained due to herbicide-organic matter bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for dwellings because of flooding and wetness. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for septic tank absorption fields because of wetness and poor filtering capacity. Contact the local Health Department for additional guidance.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for roads and streets because of flooding. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Suited
Management concerns: Dellwood—flooding, droughtiness, pesticide retention, soil fertility, nutrient leaching, root disease, climate, and high content of rock fragments; Reddies—flooding, droughtiness, pesticide retention, soil fertility, nutrient leaching, root disease, and climate
Management measures and considerations:

- Because of the flooding, these soils are difficult to manage and are severely limited during periods of inundation.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants. Split applications of lime and fertilizer help to increase their effectiveness.
- Using frequent and light applications of irrigation water helps to prevent the leaching of plant nutrients below the rooting zone.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Due to the seasonal high water table and flooding, phytophthora root disease is a potential limitation for Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as toeslopes and drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Areas of the Dellwood soil are severely limited for lawns and landscaping due to the high content of rock fragments.

Interpretive Group

Land capability classification: Dellwood—IIIs; Reddies—IIw

DrB—Dillard loam, 1 to 5 percent slopes, rarely flooded

Setting

Landscape: Mountain valleys of low mountains, dominantly along Shelton Laurel and Spring Creeks in the northwestern parts of the county and the intermountain hills in the southeastern parts of the county
Elevation range: 1,250 to 2,250 feet
Landform: Low stream terraces
Landform position: Concave to planar toeslopes
Shape of areas: Long and narrow
Size of areas: As much as 11 acres

Composition

Dillard soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 7 inches—dark brown loam

Subsoil:
7 to 50 inches—yellowish brown clay loam that has mottles in shades of red, brown, and gray
50 to 80 inches—light gray sandy loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Moderately well drained
General texture class: Loamy
Permeability: Moderately slow
Available water capacity: Moderate or high
Depth to seasonal high water table: 2.0 to 3.0 feet from December through May and 2.0 to 3.5 feet from June through November
Hazard of flooding: Rare; throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Moderate
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Soil reaction: Strongly acid to moderately acid in the A horizon, except where limed, and very strongly acid to moderately acid in the B and C horizons
Parent material: Old alluvium derived from felsic or mafic, high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Well drained Tate soils on footslopes and Statler soils on low terraces

- Soils with surface layers that have less organic matter than the Dillard soil; in cropped fields
- Random areas of moderately eroded soils
- Well drained Braddock and Unison soils that have clayey subsoils; on high terraces
- Somewhat poorly drained French soils that have subsoils that are loamy in the upper part and have strata with a high content of rock fragments at a depth of 20 to 40 inches; along stream channels
- Very poorly drained Hemphill soils that have clayey subsoils; in depressions and backwater areas
- Well drained Rosman soils that have loamy subsoils; along stream channels
- Moderately well drained Dellwood and Reddies soils that are loamy in the upper part and have strata with a high content of rock fragments at a depth of 8 to 40 inches; along stream channels
- Random areas of soils on slopes of more than 5 percent

Similar inclusions:
- Dillard soils that have sandy loam, fine sandy loam, and sandy clay loam surface textures

Land Use

Dominant Uses: Cropland
Other Uses: Pasture and hayland

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Erodibility, climate, tilth, and soil fertility
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility and soil fertility
Management measures and considerations:
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and

removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Erodibility, wetness, climate, root disease, and soil fertility
Management measures and considerations:

- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and very high for eastern white pine
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to slope, the high content of organic matter in the surface layer, and the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Flooding, wetness, erodibility, and corrosivity
Management measures and considerations:

- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for dwellings.
- This map unit is difficult to manage for dwellings due to a seasonal high water table at a depth of 2.0 to 3.0 feet.
- The risk of corrosion damage to uncoated steel and concrete is moderate or high.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Wetness, seeps and springs, and restricted permeability

Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for septic tank absorption fields.
- This map unit is difficult to manage for septic tank absorption fields due to a seasonal high water table at a depth of 2.0 to 3.0 feet.
- Excavations may cut into seeps and springs. These areas should be avoided.

Local roads and streets

Suitability: Poorly suited
Management concerns: Low strength, seeps and springs, erodibility, and flooding
Management measures and considerations:
- When the soil is wet, unsurfaced roads are highly erodible and very slick due the content of silt and clay in the subsoil.
- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.

Lawns and landscaping

Suitability: Suited
Management concerns: Erodibility, wetness, flooding, root disease, soil fertility, soil compaction, and climate
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration. Vegetating disturbed areas and using erosion-control structures such as sediment fences helps to keep eroding soil onsite.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Interpretive Group

Land capability classification: IIw

DtD—Ditney-Unicoi complex, 15 to 30 percent slopes, very stony

Setting

Landscape: Low and intermediate mountains in the northwestern and northern parts of the county

Elevation range: 1,400 to 3,950 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow
Size of areas: As much as 101 acres

Composition

Ditney soil and similar inclusions: 55 percent
Unicoi soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Ditney

Surface layer:
0 to 7 inches—dark yellowish brown fine sandy loam

Subsoil:
7 to 25 inches—yellowish brown sandy loam
25 to 30 inches—brownish yellow cobbly sandy loam

Bedrock:
30 to 80 inches—unweathered, hard, arkosic metasandstone and quartzite

Unicoi

Surface layer:
0 to 5 inches—dark grayish brown cobbly sandy loam

Subsoil:
5 to 16 inches—dark yellowish brown very cobbly sandy loam

Bedrock:
16 to 80 inches—unweathered, hard, arkosic metasandstone and quartzite

Soil Properties and Qualities

Depth class: Ditney—moderately deep; Unicoi—shallow
Drainage class: Ditney—well drained; Unicoi—somewhat excessively drained
General texture class: Ditney—loamy; Unicoi—loamy with many rock fragments
Permeability: Moderately rapid
Available water capacity: Very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum weathered from low-grade metasedimentary rock
Depth to bedrock: Ditney—20 to 40 inches to hard bedrock; Unicoi—7 to 20 inches to hard bedrock

Other distinctive properties: Water movement along bedrock contacts; low natural fertility

Minor Components

Dissimilar inclusions:
- Random areas of Soco and Stecoah soils that have soft bedrock at a depth of 20 to 60 inches
- Random areas of Junaluska and Brasstown soils that have more clay in the subsoil than the Ditney and Unicoi soils and have soft bedrock at a depth of 20 to 60 inches
- Widely scattered areas of rock outcrop
- Maymead soils that have bedrock at a depth of more than 60 inches; in saddles, gaps, and concave areas at the head of drains
- Chestoa soils that have thicker surface layers with more organic matter and have hard bedrock at a depth of 20 to 40 inches; in the Baxter Branch and Bear Creek areas
- Random areas of soils on slopes of less than 15 percent or more than 30 percent
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Ditney soils that have sandy loam and loam surface textures
- Unicoi soils that have sandy loam and fine sandy loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation and pasture

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, and the very stony surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management concerns: Equipment use, rooting depth, droughtiness, erodibility, and soil fertility
Management measures and considerations:
- These soils are limited for pasture and hay production because of the moderately deep and shallow rooting depth, very stony surface, and slope.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Ditney—poorly suited; Unicoi—unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the

slope, erodibility, depth to bedrock, and the very stony surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Low for upland hardwoods and moderate for eastern white pine
Suitability: Poorly suited
Management concerns: Equipment use, erodibility, windthrow hazard, and seedling survival
Management measures and considerations:

- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the low natural fertility and the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Extensive blasting, shaping, and grading is needed if roads are to be constructed on the contour.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited due to the limited rooting depth.

Urban Development

Dwellings

Suitability: Ditney—poorly suited; Unicoi—unsuited
Management measures and considerations:

- This map unit is severely limited for dwellings because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for septic tank absorption fields because of the depth to bedrock. Contact the local Health Department for additional guidance.

Local roads and streets

Suitability: Poorly suited
Management concerns: Depth to bedrock, slope, erodibility, slippage, and frost action
Management measures and considerations:

- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Extensive blasting, shaping, and grading is needed if roads are to be constructed on the contour.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, helps to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the low natural fertility and the droughty nature of these soils, revegetating cut and fill slopes can be difficult.

- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Ditney—poorly suited; Unicoi—unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, and the very stony surface. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: VIIs

DuE—Ditney-Unicoi complex, 30 to 50 percent slopes, very rocky

Setting

Landscape: Low and intermediate mountains in the northwestern and northern parts of the county
Elevation range: 1,400 to 3,950 feet
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: As much as 119 acres

Composition

Ditney soil and similar inclusions: 50 percent
Unicoi soil and similar inclusions: 30 percent
Dissimilar inclusions: 20 percent

Typical Profile

Ditney

Surface layer:
0 to 7 inches—dark yellowish brown fine sandy loam

Subsoil:
7 to 25 inches—yellowish brown sandy loam
25 to 30 inches—brownish yellow cobbly sandy loam

Bedrock:
30 to 80 inches—unweathered, hard, arkosic metasandstone and quartzite

Unicoi

Surface layer:
0 to 5 inches—dark grayish brown cobbly sandy loam

Subsoil:
5 to 16 inches—dark yellowish brown very cobbly sandy loam

Bedrock:
16 to 80 inches—unweathered, hard, arkosic metasandstone and quartzite

Soil Properties and Qualities

Depth class: Ditney—moderately deep; Unicoi—shallow

Drainage class: Ditney—well drained; Unicoi—somewhat excessively drained
General texture class: Ditney—loamy; Unicoi—loamy with many rock fragments
Permeability: Moderately rapid
Available water capacity: Very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Ditney—low; Unicoi—medium
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Extent of rock outcrop: About 10 percent on the soil surface
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: Ditney—20 to 40 inches to hard bedrock; Unicoi—7 to 20 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts; soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material; low natural fertility

Minor Components

Dissimilar inclusions:
- Random areas of Soco and Stecoah soils that have soft bedrock at a depth of 20 to 60 inches
- Random areas of Junaluska and Brasstown soils that have more clay in the subsoil than the Ditney and Unicoi soils and have soft bedrock at a depth of 20 to 60 inches
- Widely scattered areas of rock outcrop
- Northcove soils that have more rock fragments in the subsoil than the Ditney and Unicoi soils and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Maymead soils that have bedrock at a depth of more than 60 inches; in saddles, gaps, and concave areas at the head of drains
- Cheoah and Jeffrey soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Chestoa soils that have thicker surface layers with more organic matter and have hard bedrock at a depth of 20 to 40 inches; in the Baxter Branch and Bear Creek areas
- Random areas of soils on slopes of less than 30 percent or more than 50 percent
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Ditney soils that have sandy loam and loam surface textures
- Unicoi soils that have sandy loam and fine sandy loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, and the very stony surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management measures and considerations:
- This map unit is severely limited for pasture and hay production because of the moderately deep and shallow rooting depth, very stony surface, and slope.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, depth to bedrock, and the very stony surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Low for upland hardwoods and moderate for eastern white pine
Suitability: Poorly suited
Management concerns: Equipment use, erodibility, windthrow hazard, and seedling survival
Management measures and considerations:
- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the low natural fertility and the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Extensive blasting, shaping, and grading is needed if roads are to be constructed on the contour.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Ditney—poorly suited; Unicoi—unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the depth to bedrock. Contact the local Health Department for additional guidance.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, erodibility, depth to bedrock, slippage, and frost action
Management measures and considerations:
- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Extensive blasting, shaping, and grading is needed if roads are to be constructed on the contour.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the low natural fertility and the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Ditney—poorly suited; Unicoi—unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, and the very stony surface. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: VIIs

DuF—Ditney-Unicoi complex, 50 to 95 percent slopes, very rocky

Setting

Landscape: Low and intermediate mountains in the northwestern and northern parts of the county
Elevation range: 1,400 to 3,950 feet
Landform: South- to west-facing mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: As much as 548 acres

Composition

Ditney soil and similar inclusions: 45 percent
Unicoi soil and similar inclusions: 35 percent
Dissimilar inclusions: 20 percent

Typical Profile

Ditney

Surface layer:
0 to 7 inches—dark yellowish brown fine sandy loam

Subsoil:
7 to 25 inches—yellowish brown sandy loam
25 to 30 inches—brownish yellow cobbly sandy loam

Bedrock:
30 to 80 inches—unweathered, hard, arkosic metasandstone and quartzite

Unicoi

Surface layer:
0 to 5 inches—dark grayish brown cobbly sandy loam

Subsoil:
5 to 16 inches—dark yellowish brown very cobbly sandy loam

Bedrock:
16 to 80 inches—unweathered, hard, arkosic metasandstone and quartzite

Soil Properties and Qualities

Depth class: Ditney—moderately deep; Unicoi—shallow
Drainage class: Ditney—well drained; Unicoi—somewhat excessively drained
General texture class: Ditney—loamy; Unicoi—loamy with many rock fragments
Permeability: Moderately rapid
Available water capacity: Very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Ditney—medium; Unicoi—high
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Extent of rock outcrop: About 10 percent on the soil surface
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: Ditney—20 to 40 inches to hard bedrock; Unicoi—7 to 20 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts; soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material; low natural fertility

Minor Components

Dissimilar inclusions:

- Northcove soils that have more rock fragments in the subsoil than the Ditney and

Unicoi soils and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Random areas of Soco and Stecoah soils that have soft bedrock at a depth of 20 to 60 inches
- Maymead soils that have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Cheoah and Jeffrey soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Chestoa soils that have thicker surface layers with more organic matter and have hard bedrock at a depth of 20 to 40 inches; in the Baxter Branch and Bear Creek areas
- Random areas of soils on slopes of less than 50 percent or more than 95 percent
- Drainageways where landslides have occurred
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Ditney soils that have sandy loam and loam surface textures
- Unicoi soils that have sandy loam and fine sandy loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope, depth to bedrock, and the extent of rock outcrops. Contact the local Health Department for additional guidance.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: VIIs

EdD—Edneyville-Chestnut complex, 15 to 30 percent slopes, stony

Setting

Landscape: Low and intermediate mountains; dominantly in the southwestern and southeastern parts of the county
Elevation range: 2,400 to 4,800 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow or irregular
Size of areas: As much as 31 acres

Composition

Edneyville soil and similar inclusions: 50 percent
Chestnut soil and similar inclusions: 35 percent
Dissimilar inclusions: 15 percent

Typical Profile

Edneyville

Surface layer:
0 to 5 inches—very dark grayish brown fine sandy loam

Subsoil:
5 to 43 inches—dark yellowish brown fine sandy loam

Underlying material:
43 to 80 inches—light yellowish brown sandy loam saprolite

Chestnut

Surface layer:
0 to 4 inches—dark brown gravelly fine sandy loam

Subsoil:
4 to 36 inches—yellowish brown gravelly fine sandy loam

Bedrock:
36 to 80 inches—weathered biotite gneiss

Soil Properties and Qualities

Depth class: Edneyville—very deep; Chestnut—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Edneyville—moderate; Chestnut—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Soil slippage potential: None
Slope class: Moderately steep
Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface stones and cobbles that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum weathered from felsic or mafic, high-grade metamorphic or igneous rock
Depth to bedrock: Edneyville—more than 60 inches to soft bedrock; Chestnut—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:

- Cowee and browner soils that have more clay in the subsoil than the Edneyville and Chestnut soils and have soft bedrock at a depth of 20 to 40 inches; on shoulder slopes and nose slopes
- Random areas of Evard and browner soils that have more clay in the subsoil than the Edneyville and Chestnut soils and have soft bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil than the Edneyville and Chestnut soils and have soft bedrock at a depth of 40 to more than 60 inches

- Tate soils that have thicker surface layers with more organic matter in the surface layer, have more clay in the subsoil, and have bedrock at a depth of more than 60 inches; in saddles and gaps
- Widely scattered areas of rock outcrop on narrow ridges
- Cleveland and Ashe soils that have hard bedrock at a depth of 10 to 40 inches; adjacent to rock outcrops
- Random areas of soils on slopes of less than 15 percent or more than 30 percent
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Edneyville and Chestnut soils that have coarse sandy loam, sandy loam, and loam surface textures
- Random areas of Buladean soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture, hayland, ornamental crops, and building site development

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Edneyville—equipment use, erodibility, soil fertility, and rooting depth; Chestnut—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- These soils are difficult to manage for cultivated crops because the slope limits equipment use.
- Using resource management systems that include contour farming, conservation tillage, crop residue management, stripcropping, winter cover crops, and crop rotations that include grasses and legumes helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Incorporating plant residue into the soil helps to improve the water-holding capacity, and using shallow-rooted crops helps to overcome the moderately deep rooting depth of the Chestnut soil.

Pasture and hayland

Suitability: Suited
Management concerns: Edneyville—equipment use, erodibility, soil fertility, and rooting depth; Chestnut—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned clipping and harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth,

the Chestnut soil is difficult to manage for the production of pasture and hay crops.

- Using drought-tolerant plants helps to increase productivity.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Edneyville—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, and rooting depth; Chestnut—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness
Management measures and considerations:

- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent fracture of the ball and separation of the soil from the roots caused by low moisture and minimal clay content.
- The slope affects the shape of low growing ornamentals on the uphill side.
- In areas where water concentrates, such as toeslopes and footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity, windthrow hazard, and the moderately deep rooting depth, areas of the Chestnut soil are difficult to manage for orchard and ornamental crops.
- Using supplemental irrigation and crop varieties adapted to droughty conditions helps to increase productivity.

Woodland Management and Productivity

Potential for commercial species: Moderately high for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Edneyville—equipment use, erodibility, and seedling survival; Chestnut—equipment use, erodibility, seedling survival, and windthrow hazard
Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Chestnut soil because of the limited rooting depth.
- Planting improved varieties of eastern white pine helps to increase productivity.
- Replanting may be necessary on warm, south- to west-facing slopes because of reduced soil moisture. Planting when the soil is moist for extended periods helps to increase seedling survival.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Edneyville—slope, erodibility, and corrosivity; Chestnut—slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:

- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Using corrosion-resistant materials for foundations and basements helps to reduce the risk of damage to concrete.
- The soft bedrock underlying the Chestnut soil is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Edneyville and Chestnut—slope; Chestnut—slope and depth to bedrock
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Edneyville soil may improve the performance of filter fields.
- Increasing the size of the septic tank absorption field helps to improve the performance.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, slippage, erodibility, depth to bedrock, and frost action
Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, helps to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible helps to prevent slippage and excessive soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- The soft bedrock underlying the Chestnut soil is not difficult to excavate but is difficult to vegetate and pack into a fill slope.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Edneyville—slope, erodibility, droughtiness, soil fertility, and depth to bedrock; Chestnut—slope, erodibility, droughtiness, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.

- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Chestnut soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock needs to be removed.

Interpretive Group

Land capability classification: IVe

EdE—Edneyville-Chestnut complex, 30 to 50 percent slopes, stony

Setting

Landscape: Low and intermediate mountains; dominantly in the southwestern and southeastern parts of the county
Elevation range: 2,400 to 4,800 feet
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: As much as 91 acres

Composition

Edneyville soil and similar inclusions: 55 percent
Chestnut soil and similar inclusions: 25 percent
Dissimilar inclusions: 20 percent

Typical Profile

Edneyville

Surface layer:
0 to 5 inches—very dark grayish brown fine sandy loam

Subsoil:
5 to 43 inches—dark yellowish brown fine sandy loam

Underlying material:
43 to 80 inches—light yellowish brown sandy loam saprolite

Chestnut

Surface layer:
0 to 4 inches—dark brown gravelly fine sandy loam

Subsoil:
4 to 36 inches—yellowish brown gravelly fine sandy loam

Bedrock:
36 to 80 inches—weathered biotite gneiss

Soil Properties and Qualities

Depth class: Edneyville—very deep; Chestnut—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Edneyville—moderate; Chestnut—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Surface stones and cobbles that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic, high-grade metamorphic or igneous rock
Depth to bedrock: Edneyville—more than 60 inches to soft bedrock; Chestnut—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:

- Cowee and browner soils that have more clay in the subsoil than the Edneyville and Chestnut soils and have soft bedrock at a depth of 20 to 40 inches; on shoulder slopes and nose slopes
- Random areas of Evard and browner soils that have more clay in the subsoil than the Edneyville and Chestnut soils and have soft bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil than the Edneyville and Chestnut soils and have soft bedrock at a depth of 40 to more than 60 inches
- Tate and Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Porters and Unaka soils that have thicker surface layers with more organic matter; at higher elevations and on north- to east-facing side slopes
- Widely scattered areas of rock outcrop on narrow ridges
- Cleveland and Ashe soils that have hard bedrock at a depth of 10 to 40 inches; adjacent to rock outcrops
- Random areas of soils on slopes of less than 30 percent or more than 50 percent
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:

- Edneyville and Chestnut soils that have coarse sandy loam, sandy loam, and loam surface textures
- Random areas of Buladean soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture, building site development, and ornamental crops

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope and erodibility. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management concerns: Edneyville—equipment use, erodibility, soil fertility, and rooting depth; Chestnut—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- Because of the slope, this map unit is difficult to manage for pasture or hayland.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Chestnut soil is difficult to manage for the production of pasture and hay crops.
- Using drought-tolerant plants helps to increase productivity.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Edneyville—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, and rooting depth; Chestnut—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent fracture of the ball and separation of the soil from the roots caused by low available moisture and minimal clay content.
- The slope affects the shape of low-growing ornamentals on the uphill side.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity, windthrow hazard, and the moderately deep rooting depth, areas of the Chestnut soil are difficult to manage for orchard and ornamental crops.

- Using supplemental irrigation and crop varieties adapted to droughty conditions helps to increase productivity.

Woodland Management and Productivity

Potential for commercial species: Moderately high for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Edneyville—equipment use, erodibility, and seedling survival; Chestnut—equipment use, erodibility, seedling survival, and windthrow hazard
Management measures and considerations:

- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Chestnut soil because of the limited rooting depth.
- Planting improved varieties of eastern white pine helps to increase productivity.
- Replanting may be necessary on warm, south- to west-facing slopes because of reduced soil moisture. Planting when the soil is moist for extended periods helps to increase seedling survival.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Edneyville—slope, erodibility, and corrosivity; Chestnut—slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:

- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Using corrosion-resistant materials for foundations and basements helps to reduce the risk of damage to concrete.
- The soft bedrock underlying the Chestnut soil is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Edneyville—slope; Chestnut—slope and depth to bedrock
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.

- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Edneyville soil may improve the performance of filter fields.
- Increasing the size of the septic tank absorption field helps to improve the performance.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, slippage, erodibility, depth to bedrock, and frost action
Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- The soft bedrock underlying the Chestnut soil is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Edneyville—slope, erodibility, droughtiness, soil fertility, and depth to bedrock; Chestnut—slope, erodibility, droughtiness, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Chestnut soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock needs to be removed.

Interpretive Group

Land capability classification: VIe

EdF—Edneyville-Chestnut complex, 50 to 95 percent slopes, stony

Setting

Landscape: Low and intermediate mountains; dominantly in the southwestern and southeastern parts of the county

Elevation range: 2,400 to 4,800 feet
Landform: South- to west-facing mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: As much as 106 acres

Composition

Edneyville soil and similar inclusions: 45 percent
Chestnut soil and similar inclusions: 35 percent
Dissimilar inclusions: 20 percent

Typical Profile

Edneyville

Surface layer:
0 to 3 inches—very dark grayish brown fine sandy loam

Subsoil:
3 to 23 inches—dark yellowish brown sandy loam
23 to 39 inches—brownish yellow loam
39 to 51 inches—yellowish brown sandy loam

Underlying material:
51 to 72 inches—light yellowish brown gravelly sandy loam saprolite

Bedrock:
72 to 83 inches—weathered, biotite gneiss

Chestnut

Surface layer:
0 to 4 inches—dark brown gravelly fine sandy loam

Subsoil:
4 to 36 inches—yellowish brown gravelly fine sandy loam

Bedrock:
36 to 80 inches—weathered biotite gneiss

Soil Properties and Qualities

Depth class: Edneyville—very deep; Chestnut—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Edneyville—moderate; Chestnut—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Medium
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Surface stones and cobbles that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile

Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic, high-grade metamorphic or igneous rock
Depth to bedrock: Edneyville—more than 60 inches to soft bedrock; Chestnut—20 to 40 inches to soft bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Cowee and browner soils that have more clay in the subsoil than the Edneyville and Chestnut soils and have soft bedrock at a depth of 20 to 40 inches; on shoulder slopes and nose slopes
- Random areas of Evard and browner soils that have more clay in the subsoil than the Edneyville and Chestnut soils and have soft bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil than the Edneyville and Chestnut soils and have soft bedrock at a depth of 40 to more than 60 inches
- Tate and Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Porters and Unaka soils that have thicker surface layers with more organic matter; at higher elevations and on north- to east-facing side slopes
- Widely scattered areas of rock outcrop on narrow ridges
- Cleveland and Ashe soils that have hard bedrock at a depth of 10 to 40 inches; adjacent to rock outcrops
- Random areas of soils on slopes of less than 50 percent or more than 95 percent
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Edneyville and Chestnut soils that have coarse sandy loam, sandy loam, and loam surface textures
- Random areas of Buladean soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope and erodibility. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for the production of pasture and hay crops because of the slope and erodibility. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope and erodibility. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderately high for upland hardwoods and high for eastern white pine
Suitability: Poorly suited
Management concerns: Edneyville—equipment use and erodibility; Chestnut—equipment use, erodibility, and windthrow
Management measures and considerations:
- Using cable logging methods helps to overcome equipment limitations and prevents the acceleration of erosion caused by road construction, skid trails, and disturbance of the forest floor by heavy machinery.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Chestnut soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope and erodibility. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope and depth to bedrock in the Chestnut soil. Contact the local Health Department for additional guidance.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited

Management measures and considerations:

- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, and depth to bedrock in the Chestnut soil. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: VIIe

EfA—Ela loam, 0 to 2 percent slopes, frequently flooded

Setting

Landscape: Mountain valleys of low and intermediate mountains; dominantly in the northeastern part of the county
Elevation range: 1,300 to 3,200 feet
Landform: Flood plains
Landform position: Planar to slightly concave bottomland slopes
Shape of areas: Irregular
Size of areas: As much as 54 acres

Composition

Ela soil and similar inclusions: 75 percent
Dissimilar inclusions: 25 percent

Typical Profile

Surface layer:
0 to 13 inches—very dark grayish brown loam

Underlying material:
13 to 38 inches—dark gray sandy loam that has mottles in shades of brown
38 to 80 inches—dark gray very cobbly sandy loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Poorly drained
General texture class: Loamy in the upper part and sandy-skeletal in the lower part
Permeability: Moderately rapid in the surface horizon and upper portion of the underlying material and rapid in the lower portion
Available water capacity: Low
Depth to seasonal high water table: 1.0 foot or less from December through May, 2.0 to 3.5 feet from June through November, and 0.5 foot to 1.5 feet from June through November
Hazard of flooding: Frequent; throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Nearly level
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: None or slight
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, which allows late spring and early fall frost

Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Depth to contrasting material: 20 to 40 inches to deposits of cobbles and gravel that are stratified with sandy or loamy material
Other distinctive properties: Soiil subject to ponding for brief duration throughout the year; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:

- Somewhat poorly drained French soils in slightly higher-lying positions
- Soils that have strata with a high content of rock fragments at a depth of more than 40 inches; in slightly higher-lying positions
- Soils that have a rare flooding hazard; on adjacent toeslopes
- Poorly drained soils that have clayey subsoils; in low-lying depressions in backwater areas
- Random areas of soils on slopes of more than 2 percent

Similar inclusions:

- Ela soils that have sandy loam and fine sandy loam surface textures

Land Use

Dominant Uses: Pasture and hayland
Other Uses: Cropland and wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for crop production because of wetness and flooding. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Flooding, wetness, pesticide retention, soil fertility, nutrient leaching, and erodibility
Management measures and considerations:

- Although most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- Maintaining existing drainageways and ditches helps to remove excess water.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using split applications of lime and fertilize helps to increase their effectiveness and helps to prevent the leaching of plant nutrients below the rooting zone and into the water table.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of wetness and flooding. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of wetness and flooding. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of flooding and wetness. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of flooding, wetness, and a poor filtering capacity. Contact the local Health Department for additional guidance.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of wetness and flooding. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of wetness and flooding. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: VIw

EvD2—Evard-Cowee complex, 15 to 30 percent slopes, moderately eroded

Setting

Landscape: Intermountain hills and low or intermediate mountains; dominantly in the north-central, southeastern, and southwestern parts of the county

Elevation range: 1,800 to 3,500 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow
Size of areas: As much as 86 acres

Composition

Evard soil and similar inclusions: 55 percent
Cowee soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Evard

Surface layer:
0 to 5 inches—brown clay loam

Subsoil:
5 to 29 inches—reddish brown sandy clay loam
29 to 37 inches—yellowish sandy loam

Underlying material:
37 to 80 inches—reddish brown sandy loam saprolite

Cowee

Surface layer:
0 to 5 inches—dark reddish yellow clay loam

Subsoil:
5 to 27 inches—light reddish brown gravelly sandy clay loam

Bedrock:
27 to 80 inches—weathered, hornblende gneiss

Soil Properties and Qualities

Depth class: Evard—very deep; Cowee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Evard—moderate; Cowee—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Moderate; about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Evard—more than 60 inches; Cowee—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of Chestnut, Buladean, and Edneyville soils that have less clay in the subsoil than the Evard and Cowee soils and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Clifton soils that have clayey subsoils and have bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil than the Evard and Cowee soils and have bedrock at a depth of 20 to more than 60 inches
- Tate soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in saddles and gaps and in concave areas at the head of drains
- Soils which have high base saturation in the lower part of the subsoil; predominantly in the south-central and southeastern parts of the county
- Random areas of soils on slopes of less than 15 percent or more than 30 percent
- Widely scattered areas of rock outcrop on narrow ridges

Similar inclusions:
- Evard and Cowee soils that have loam and sandy clay loam surface textures
- Random areas of similar soils that have brown subsoils
- Random areas of similar soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Woodland, wildlife habitat, pasture, and hayland
Other Uses: Cropland, building site development, and ornamental crops

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Evard—equipment use, erodibility, tilth, soil fertility, and rooting depth; Cowee—equipment use, erodibility, tilth, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- These soils are difficult to manage for cultivated crops because the slope limits equipment use.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Cowee soil is difficult to manage for cultivated crops.

Pasture and hayland

Suitability: Suited
Management concerns: Evard—equipment use, erodibility, soil fertility, and rooting depth; Cowee—equipment use, erodibility, soil fertility, rooting depth, and droughtiness

Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Cowee soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Evard—suited; Cowee—poorly suited
Management concerns: Evard—equipment use, erodibility, soil fertility, plant shape, and rooting depth; Cowee—equipment use, erodibility, soil fertility, plant shape, rooting depth, and droughtiness
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity, windthrow hazard, and the moderately deep rooting depth, areas of the Cowee soil are difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Evard—erodibility and equipment use; Cowee—erodibility, equipment use, and windthrow hazard
Management measures and considerations:
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Cowee soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, and corrosivity; Cowee—slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete and uncoated steel.
- The soft bedrock underlying the Cowee soil is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Evard—slope and restricted permeability; Cowee—slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.
- Locating and using areas of the deeper Evard soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, and frost action; Cowee—slope, erodibility, frost action, and depth to bedrock
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- The soft bedrock underlying the Cowee soil is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, soil compaction, soil fertility, and depth to bedrock; Cowee—slope, erodibility, soil compaction, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.

- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Cowee soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock needs to be removed.

Interpretive Group

Land capability classification: IVe

EvE2—Evard-Cowee complex, 30 to 50 percent slopes, moderately eroded

Setting

Landscape: Intermountain hills and low or intermediate mountains; dominantly in the north-central, southeastern, and southwestern parts of the county
Elevation range: 1,800 to 3,500 feet
Landform: Ridges and south- to west-facing hillslopes and mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: As much as 572 acres

Composition

Evard soil and similar inclusions: 55 percent
Cowee soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Evard

Surface layer:
0 to 5 inches—brown clay loam

Subsoil:
5 to 29 inches—reddish brown sandy clay loam
29 to 37 inches—yellowish sandy loam

Underlying material:
37 to 80 inches—reddish brown sandy loam saprolite

Cowee

Surface layer:
0 to 5 inches—dark reddish yellow clay loam

Subsoil:
5 to 27 inches—light reddish brown gravelly sandy clay loam

Bedrock:
27 to 80 inches—weathered, hornblende gneiss

Soil Properties and Qualities

Depth class: Evard—very deep; Cowee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Evard—moderate; Cowee—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Moderate; about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Evard—more than 60 inches; Cowee—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:

- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of Chestnut, Buladean, and Edneyville soils that have less clay in the subsoil than the Evard and Cowee soils and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Clifton soils that have clayey subsoils and have bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil than the Evard and Cowee soils and have bedrock at a depth of 20 to more than 60 inches
- Soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Tate and Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Soils which have high base saturation in the lower part of the subsoil; predominantly in the south-central and southeastern parts of the county
- Random areas of soils on slopes of less than 30 percent or more than 50 percent
- Widely scattered areas of rock outcrop

Similar inclusions:

- Evard and Cowee soils that have loam and sandy clay loam surface textures
- Random areas of similar soils that have brown subsoils
- Random areas of similar soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Woodland, wildlife habitat, and pasture
Other Uses: Building site development and ornamental crops

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope and erodibility. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management concerns: Evard—equipment use, erodibility, soil fertility, and rooting depth; Cowee—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- Because of the slope, this map unit is difficult to manage for pasture or hayland.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Cowee soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Evard—equipment use, erodibility, soil fertility, plant shape, and rooting depth; Cowee—equipment use, erodibility, soil fertility, plant shape, rooting depth, and droughtiness
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard, caused by the moderately deep rooting depth, areas of the Cowee soil are difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Evard—equipment use and erodibility; Cowee—equipment use, erodibility, and windthrow hazard

Management measures and considerations:
- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Cowee soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, and corrosivity; Cowee—slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete and uncoated steel.
- The soft bedrock underlying the Cowee soil is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Evard—slope and restricted permeability; Cowee—slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.
- Locating and using areas of the deeper Evard soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, and frost action; Cowee—slope, erodibility, frost action, and depth to bedrock
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as

broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- The soft bedrock underlying the Cowee soil is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, soil compaction, soil fertility, and depth to bedrock; Cowee—slope, erodibility, soil compaction, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Cowee soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock needs to be removed.

Interpretive Group

Land capability classification: VIe

EvF2—Evard-Cowee complex, 50 to 95 percent slopes, moderately eroded

Setting

Landscape: Low and intermediate mountains; dominantly in the north-central, southeastern, and southwestern parts of the county
Elevation range: 1,800 to 3,500 feet
Landform: South- to west-facing mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: As much as 36 acres

Composition

Evard soil and similar inclusions: 50 percent
Cowee soil and similar inclusions: 30 percent
Dissimilar inclusions: 20 percent

Typical Profile

Evard

Surface layer:
0 to 5 inches—brown clay loam

Subsoil:
5 to 29 inches—reddish brown sandy clay loam
29 to 37 inches—yellowish sandy loam

Underlying material:
37 to 80 inches—reddish brown sandy loam saprolite

Cowee

Surface layer:
0 to 5 inches—dark reddish yellow clay loam

Subsoil:
5 to 27 inches—light reddish brown gravelly sandy clay loam

Bedrock:
27 to 80 inches—weathered, hornblende gneiss

Soil Properties and Qualities

Depth class: Evard—very deep; Cowee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Evard—moderate; Cowee—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Medium
Extent of erosion: Moderate; about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic, high-grade metamorphic or igneous rock
Depth to bedrock: Evard—more than 60 inches to soft bedrock; Cowee—20 to 40 inches to soft bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of Chestnut, Buladean, and Edneyville soils that have less clay in the subsoil than the Evard and Cowee soils and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of soils that have more mica in the subsoil than the Evard and Cowee soils and have bedrock at a depth of 20 to more than 60 inches

- Soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Tate and Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Soils that have high base saturation in the lower part of the subsoil; predominantly in the south-central and southeastern parts of the county
- Random areas of soils on slopes of less than 50 percent or more than 95 percent

Similar inclusions:

- Evard and Cowee soils that have loam and sandy clay loam surface textures
- Random areas of similar soils that have brown subsoils
- Random areas of similar soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation and pastureland

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for crop production because of the slope and erodibility. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for the production of pasture and hay crops because of the slope and erodibility. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for orchard and ornamental crops because of the slope and erodibility. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderately high for upland hardwoods and high for eastern white pine
Suitability: Poorly suited
Management concerns: Evard—equipment use and erodibility; Cowee—equipment use, erodibility, and windthrow hazard
Management measures and considerations:

- Using cable logging methods helps to overcome equipment limitations and prevents the acceleration of erosion caused by road construction, skid trails, and disturbance of the forest floor by heavy machinery.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.

- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Cowee soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope and erodibility. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope and depth to bedrock in the Cowee soil. Contact the local Health Department for additional guidance.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, and depth to bedrock in the Cowee soil. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, and depth to bedrock in the Cowee soil. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: VIIe

EwD—Evard-Cowee complex, 15 to 30 percent slopes, stony

Setting

Landscape: Intermountain hills and low or intermediate mountains; dominantly in the north-central, southeastern, and southwestern parts of the county
Elevation range: 2,600 to 3,500 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow
Size of areas: As much as 90 acres

Composition

Evard soil and similar inclusions: 55 percent
Cowee soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Evard

Surface layer:
0 to 5 inches—dark yellowish brown loam

Subsoil:
5 to 32 inches—yellowish red clay loam
32 to 45 inches—yellowish red loam

Underlying material:
45 to 80 inches—multicolored sandy loam saprolite

Cowee

Surface layer:
0 to 5 inches—dark reddish brown sandy loam

Subsoil:
5 to 38 inches—light reddish brown clay loam

Bedrock:
38 to 80 inches—weathered, hornblende gneiss

Soil Properties and Qualities

Depth class: Evard—very deep; Cowee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Evard—moderate; Cowee—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Soil slippage potential: None
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Evard—more than 60 inches; Cowee—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Random areas of Clifton soils that have clayey subsoils and bedrock at a depth of more than 60 inches

- Random areas of soils that have more mica in the subsoil than the Evard and Cowee soils and have bedrock at a depth of 20 to more than 60 inches
- Tate soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in saddles and gaps and concave areas at the head of drains
- Random areas of Chestnut, Buladean, and Edneyville soils that have less clay in the subsoil than the Evard and Cowee soils and have soft bedrock at a depth of 20 to more than 60 inches
- Soils that have high base saturation in the lower part of the subsoil; predominantly in the south-central and southeastern parts of the county
- Random areas of soils on slopes of less than 15 percent or more than 30 percent
- Random areas of severely eroded soils where underlying material is exposed at the surface

Similar inclusions:
- Evard and Cowee soils that have sandy loam and fine sandy loam surface textures
- Random areas of similar soils that have brown subsoils
- Random areas of similar soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Woodland, wildlife habitat, pasture, and hayland
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Evard—equipment use, erodibility, tilth, soil fertility, and rooting depth; Cowee—equipment use, erodibility, tilth, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- These soils are difficult to manage for cultivated crops because the slope limits equipment use.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface help to minimize clodding and crusting and increases rainfall infiltration.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Cowee soil is difficult to manage for cultivated crops.

Pasture and hayland

Suitability: Suited
Management concerns: Evard—equipment use, erodibility, soil fertility, and rooting depth; Cowee—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and

removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Cowee soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Evard—suited; Cowee—poorly suited
Management concerns: Evard—equipment use, erodibility, soil fertility, plant shape, and rooting depth; Cowee—equipment use, erodibility, soil fertility, plant shape, rooting depth, and droughtiness
Management measures and considerations:
- These soils are difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity, windthrow hazard, and the moderately deep rooting depth, areas of the Cowee soil are difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Evard—erodibility and equipment use; Cowee—erodibility, equipment use, and windthrow hazard
Management measures and considerations:
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Cowee soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, and corrosivity; Cowee—slope, erodibility, corrosivity, and depth to bedrock

Management measures and considerations:

- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete and uncoated steel.
- The soft bedrock underlying the Cowee soil is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Evard—slope and restricted permeability; Cowee—slope and depth to bedrock
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.
- Locating and using areas of the deeper Evard soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, and frost action; Cowee—slope, erodibility, frost action, and depth to bedrock
Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, helps to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- The soft bedrock underlying the Cowee soil is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, soil compaction, soil fertility, and depth to bedrock; Cowee—slope, erodibility, soil compaction, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the

subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.

- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Cowee soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock needs to be removed.

Interpretive Group

Land capability classification: IVe

EwE—Evard-Cowee complex, 30 to 50 percent slopes, stony

Setting

Landscape: Intermountain hills and low or intermediate mountains; dominantly in the north-central, southeastern, and southwestern parts of the county
Elevation range: 2,600 to 3,500 feet
Landform: Ridges and south- to west-facing hillslopes and mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: As much as 181 acres

Composition

Evard soil and similar inclusions: 55 percent
Cowee soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Evard

Surface layer:
0 to 5 inches—dark yellowish brown loam

Subsoil:
5 to 32 inches—yellowish red clay loam
32 to 45 inches—yellowish red loam

Underlying material:
45 to 80 inches—multicolored sandy loam saprolite

Cowee

Surface layer:
0 to 5 inches—dark reddish brown sandy loam

Subsoil:
5 to 38 inches—light reddish brown clay loam

Bedrock:
38 to 80 inches—weathered, hornblende gneiss

Soil Properties and Qualities

Depth class: Evard—very deep; Cowee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Evard—moderate; Cowee—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Evard—more than 60 inches; Cowee—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Random areas of Clifton soils that have clayey subsoils and have bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil than the Evard and Cowee soils and have bedrock at a depth of 20 to more than 60 inches
- Random areas of Chestnut, Buladean, and Edneyville soils that have less clay in the subsoil than the Evard and Cowee soils and have soft bedrock at a depth of 20 to more than 60 inches
- Soils with thicker surface layers with more organic matter; on north- to east-facing side slopes
- Tate and Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Random areas of soils on slopes of less than 30 percent or more than 50 percent
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Soils which have high base saturation in the lower part of the subsoil; predominantly in the south-central and southeastern parts of the county
- Widely scattered areas of rock outcrop

Similar inclusions:
- Evard and Cowee soils that have sandy loam and fine sandy loam surface textures
- Random areas of similar soils that have brown subsoils
- Random areas of similar soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Woodland, wildlife habitat, and pasture
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope and erodibility. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management concerns: Evard—equipment use, erodibility, soil fertility, and rooting depth; Cowee—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- Because of the slope, this map unit is difficult to manage for pasture or hayland.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Cowee soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Evard—equipment use, erodibility, soil fertility, plant shape, and rooting depth; Cowee—equipment use, erodibility, soil fertility, plant shape, rooting depth, and droughtiness
Management measures and considerations:
- These soils are difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity, windthrow hazard, and the moderately deep rooting depth, areas of the Cowee soil are difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Evard—equipment use and erodibility; Cowee—equipment use, erodibility, and windthrow hazard

Management measures and considerations:

- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Cowee soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Evard—slope, erodibility, and corrosivity; Cowee—slope, erodibility, corrosivity, and depth to bedrock

Management measures and considerations:

- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete and uncoated steel.
- The soft bedrock underlying the Cowee soil is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Evard—slope and restricted permeability; Cowee—slope and depth to bedrock

Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.
- Locating and using areas of the deeper Evard soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited

Management concerns: Evard—slope, erodibility, and frost action; Cowee—slope, erodibility, frost action, and depth to bedrock

Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as

broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- The soft bedrock underlying the Cowee soil is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, soil compaction, soil fertility, and depth to bedrock; Cowee—slope, erodibility, soil compaction, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Cowee soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock needs to be removed.

Interpretive Group

Land capability classification: VIe

EwF—Evard-Cowee complex, 50 to 95 percent slopes, stony

Setting

Landscape: Low and intermediate mountains; dominantly in the northeast-central, southeastern, and southwestern parts of the county
Elevation range: 2,600 to 3,500 feet
Landform: South- to west-facing mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: As much as 41 acres

Composition

Evard soil and similar inclusions: 50 percent
Cowee soil and similar inclusions: 30 percent
Dissimilar inclusions: 20 percent

Typical Profile

Evard

Surface layer:
0 to 5 inches—dark yellowish brown loam

Subsoil:
5 to 32 inches—yellowish red clay loam
32 to 45 inches—yellowish red loam

Underlying material:
45 to 80 inches—multicolored sandy loam saprolite

Cowee

Surface layer:
0 to 5 inches—dark reddish brown sandy loam

Subsoil:
5 to 38 inches—light reddish brown clay loam

Bedrock:
38 to 80 inches—weathered, hornblende gneiss

Soil Properties and Qualities

Depth class: Evard—very deep; Cowee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Evard—moderate; Cowee—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Medium
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Surface stones and cobbles that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic, high-grade metamorphic or igneous rock
Depth to bedrock: Evard—more than 60 inches to soft bedrock; Cowee—20 to 40 inches to soft bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:

- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of Chestnut, Buladean, and Edneyville soils that have less clay in the subsoil than the Evard and Cowee soils and have soft bedrock at a depth of 20 to more than 60 inches

- Random areas of soils that have more mica in the subsoil than the Evard and Cowee soils and have bedrock at a depth of 20 to more than 60 inches
- Soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Tate and Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Toecane soils that have thicker surface layers with more organic matter, more rock fragments in the subsoil, and bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Soils that have high base saturation in the lower part of the subsoil; predominantly in the south-central and southeastern parts of the county
- Random areas of soils on slopes of less than 50 percent or more than 95 percent
- Widely scattered areas of rock outcrop

Similar inclusions:
- Evard and Cowee soils that have sandy loam and fine sandy loam surface textures
- Random areas of similar soils that have brown subsoils
- Random areas of similar soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock in the Cowee soil. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, and depth to bedrock in the Cowee soil. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, and depth to bedrock in the Cowee soil. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderately high for upland hardwoods and high for eastern white pine
Suitability: Poorly suited
Management concerns: Evard—equipment use and erodibility; Cowee—equipment use, erodibility, and windthrow hazard
Management measures and considerations:
- Using cable logging methods helps to overcome equipment limitations and prevents

the acceleration of erosion caused by road construction, skid trails, and disturbance of the forest floor by heavy machinery.

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Cowee soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for dwellings because of the slope, erodibility, and depth to bedrock in the Cowee soil. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for septic tank absorption fields because of the slope and depth to bedrock in the Cowee soil. Contact the local Health Department for additional guidance.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for roads and streets because of the slope, erodibility, and depth to bedrock in the Cowee soil. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, and depth to bedrock in the Cowee soil. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: VIIe

FnD2—Fannin sandy clay loam, 15 to 30 percent slopes, moderately eroded

Setting

Landscape: Intermediate mountains, dominantly near Old Field Gap along the county line in the southeastern part of the county

Elevation range: 3,400 to 3,650 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow
Size of areas: As much as 15 acres

Composition

Fannin soil and similar inclusions: 75 percent
Dissimilar inclusions: 25 percent

Typical Profile

Surface layer:
0 to 2 inches—brown sandy clay loam

Subsoil:
2 to 31 inches—yellowish red sandy clay loam

Underlying material:
31 to 80 inches—multicolored fine sandy loam saprolite

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: Low
Extent of erosion: Moderate; about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Extremely acid to slightly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock with a high content of mica
Depth to bedrock: More than 60 inches
Other distinctive properties: A high content of mica in the subsoil; soil subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Random areas of Evard and browner soils that have less mica than the Fannin soil and a thicker subsoil
- Cowee and browner soils that have less mica in the subsoil than the Fannin soil and have soft bedrock at a depth of 20 to 40 inches; on nose slopes and shoulder slopes
- Random areas of severely eroded soils where the underlying material is exposed at the surface
- Random areas of soils on slopes of less than 15 percent or more than 30 percent

Similar inclusions:
- Fannin soils that have loam and clay loam surface textures
- Similar soils that have brown subsoils

Land Use

Dominant Uses: Pasture, woodland, and wildlife habitat
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Equipment use, erodibility, tilth, and soil fertility
Management measures and considerations:
- This soil is difficult to manage for cultivated crops because the slope limits equipment use.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.

Pasture and hayland

Suitability: Suited
Management concerns: Equipment use, erodibility, and soil fertility
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Special care should be taken when renovating pastures and establishing seedbeds to prevent further soil erosion.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Suited
Management concerns: Equipment use, erodibility, soil fertility, ball and burlap harvesting, and plant shape
Management measures and considerations:
- This soil is difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent fracture or deformation of the ball and tearing of the roots.

- The slope affects the shape of ornamentals on the uphill side.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and very high for eastern white pine
Suitability: Suited
Management concerns: Equipment use and erodibility
Management measures and considerations:

- This soil is highly erodible, droughty, difficult to compact, and unstable, especially when used as fill due to the high mica content of the subsoil and underlying material.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of mica, and the clay content of the subsoil.
- Avoiding logging operations during wet periods helps to prevent rutting of the soil surface and possible root damage from compaction.
- Livestock should not be grazed in areas managed for woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, low strength, slippage, differential settling, and corrosivity
Management measures and considerations:

- This soil is highly erodibility, droughty, difficult to compact, and unstable, especially when used as fill due to the high mica content of the subsoil and underlying material.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and restricted permeability
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Low strength, slope, slippage, erodibility, differential settling, and frost action
Management measures and considerations:

- This soil is highly erodibility, droughty, difficult to compact, and unstable, especially when used as fill due to the high mica content of the subsoil and underlying material.
- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, soil fertility, and soil compaction
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: IVe

FrA—French loam, 0 to 3 percent slopes, occasionally flooded

Setting

Landscape: Mountain valleys of intermountain hills and low and intermediate mountains throughout the county
Elevation range: 2,000 to 3,500 feet
Landform: Flood plains
Landform position: Planar to slightly concave bottomland slopes
Shape of areas: Long and narrow
Size of areas: As much as 462 acres

Composition

French soil and similar inclusions: 90 percent
Dissimilar inclusions: 10 percent

Typical Profile

Surface layer:
0 to 12 inches—brown loam

Subsoil:
12 to 30 inches—dark yellowish brown loam

Underlying material:
30 to 80 inches—grayish brown extremely gravelly sand

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Somewhat poorly drained
General texture class: Loamy in the upper part and sandy-skeletal in the lower part
Permeability: Moderate in the surface layer and subsoil and rapid in the underlying material
Available water capacity: Low
Depth to seasonal high water table: 1.0 to 2.5 feet from December through May and 2.0 to 3.5 feet from June through November
Hazard of flooding: Occasional; throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Nearly level or gently sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: None or slight
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, which allows late spring and early fall frosts
Soil reaction: Moderately acid to slightly acid throughout the profile
Parent material: Alluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Depth to contrasting material: 20 to 40 inches to deposits of cobbles and gravel that are stratified with sandy or loamy material
Other distinctive properties: Soil subject to scouring and deposition during flooding

Minor Components

Dissimilar inclusions:
- Moderately well drained Dellwood and Reddies soils that are loamy in the upper part and have strata with a high content of rock fragments at a depth of 8 to 40 inches; along stream channels
- Ela soils that are poorly drained; in depressions, old stream channels, and backwater areas
- Moderately well drained Dillard soils that have more clay in the subsoil than the French soil; on low stream terraces and toeslopes
- Well drained Tate soils on toeslopes and Statler soils on low terraces
- Well drained Rosman soils that have strata with a high content of rock fragments at a depth of more than 40 inches; in slightly higher-lying positions
- Random areas of soils on slopes of more than 3 percent
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways

Similar inclusions:
- French soils that have sandy loam and fine sandy loam surface textures

Land Use

Dominant Uses: Pasture and hayland
Other Uses: Cropland, ornamental crops, woodland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Flooding, wetness, soil fertility, nutrient leaching, pesticide retention, and climate
Management measures and considerations:
- Although most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- Maintaining existing artificial drainage systems helps to reduce wetness limitations caused by a seasonal high water table and improves soil productivity.
- Conservation tillage, winter cover crops, crop residue management, and crop rotations that include grasses and legumes helps to increase the available water capacity and improve soil fertility.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to prevent the leaching of plant nutrients below the rooting zone and into the water table.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Pasture and hayland

Suitability: Well suited
Management concerns: Flooding, wetness, pesticide retention, soil fertility, nutrient leaching, and erodibility
Management measures and considerations:
- Although most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- Maintaining existing drainageways and ditches helps to remove excess water from a seasonal high water table.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to prevent the leaching of plant nutrients below the rooting zone and into the water table.
- Using rotational grazing, implementing a well planned harvesting schedule, and

removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.

Orchard and ornamental crops

Suitability: Orchards—unsuited; ornamental crops—poorly suited
Management concerns: Flooding, wetness, root disease, climate, soil fertility, nutrient leaching, pesticide retention, and ball and burlap harvesting
Management measures and considerations:
- Because of the potential for flooding, this soil is difficult to manage for ornamental crops.
- Maintaining existing artificial drainage systems helps to reduce wetness limitations caused by a seasonal high water table and improves soil productivity.
- Due to the seasonal high water table, soil wetness, and flooding, phytophthora root disease is a severe limitation for Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to prevent the leaching of plant nutrients below the rooting zone and into the water table.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Avoiding ball and burlap harvesting during dry periods helps to prevent fracture of the ball and separation of the soil from the roots caused by low available moisture and minimal clay content.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods
Suitability: Suited
Management concerns: Wetness, flooding, and pesticide retention
Management measures and considerations:
- Restricting logging operations to periods when the soil is not saturated helps to prevent rutting and soil compaction.
- The potential for flooding should be a consideration in the placement of haul roads and log landings.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the flooding and wetness. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited

Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the wetness, poor filtering capacity, and flooding. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the flooding and wetness. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Suited
Management concerns: Flooding, wetness, root disease, pesticide retention, soil fertility, nutrient leaching, and climate
Management measures and considerations:
- This soil is difficult to manage because of the flooding.
- Maintaining existing artificial drainage systems helps to reduce wetness limitations caused by a seasonal high water table and improves soil productivity.
- Due to the seasonal high water table, soil wetness, and flooding, phytophthora root disease is a severe limitation for Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to prevent the leaching of plant nutrients below the rooting zone and into the water table.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Interpretive Group

Land capability classification: IIIw

HcE—Heintooga-Chiltoskie complex, 30 to 50 percent slopes, very stony

Setting

Landscape: High mountains at Sandymush Bald
Elevation range: 4,600 to 5,250 feet
Landform: Coves and drainageways
Landform position: Footslopes and head slopes
Shape of areas: Irregular or long and narrow
Size of areas: As much as 53 acres

Composition

Heintooga soil and similar inclusions: 55 percent

Chiltoskie soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Heintooga

Surface layer:
0 to 12 inches—dark brown very flaggy loam

Subsoil:
12 to 25 inches—brown extremely channery fine sandy loam
25 to 80 inches—yellowish brown extremely flaggy coarse sandy loam

Chiltoskie

Surface layer:
0 to 8 inches—very dark brown loam

Subsoil:
8 to 43 inches—dark yellowish brown loam
43 to 80 inches—dark yellow brown very channery sandy loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Heintooga—loamy with many rock fragments; Chiltoskie—loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Medium
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Organic matter content of surface layer: Very high
Potential frost action: Heintooga—low; Chiltoskie—moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and frequent rime ice in winter; a short growing season
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Colluvium derived from low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soils subject to overland flow of storm water from adjacent uplands; a high content of rock fragments in the Heintooga soil; a soil slippage potential when soils are saturated

Minor Components

Dissimilar inclusions:
- Areas of rubble land in drainageways and below rock outcrops
- Random areas of soils that are similar to the Chiltoskie soil but have more clay in the subsoil
- Cataloochee, Guyot, and Oconaluftee soils that have soft bedrock at a depth of 20 to more than 60 inches; along the outer edge of map unit delineations
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways

- Random areas of soils on slopes of less than 30 percent or more than 50 percent
- Unprotected areas that are windswept

Similar inclusions:
- Heintooga and Chiltoskie soils that have sandy loam and fine sandy loam surface textures

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, very stony surface, and short growing season. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for the production of pasture and hay crops because of the very stony surface and short growing season. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, the very stony surface, and short growing season. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of the very stony surface, short growing season, and low productivity. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Heintooga—unsuited; Chiltoskie—poorly suited
Management concerns: Heintooga—slope, large stones, erodibility, seeps and springs, climate, corrosivity, and cutbanks cave; Chiltoskie—slope, large stones, erodibility, seeps and springs, climate, and corrosivity
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Excavations unearth large stones and boulders.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control

structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Design modifications are needed to overcome the limitation of prolonged freezing temperatures.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing permanent retaining walls helps to improve soil stability.

Septic tank absorption fields

Suitability: Heintooga—unsuited; Chiltoskie—poorly suited
Management concerns: Heintooga—large stones, slope, seeps and springs, climate, and poor filtering capacity; Chiltoskie—large stones, slope, seeps and springs, and climate
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Excavations unearth large stones and boulders.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Design modifications are needed to overcome the limitation of prolonged freezing temperatures.
- Measures that improve the filtering capacity should be considered; the Heintooga soil readily absorbs but does not adequately filter effluent.

Local roads and streets

Suitability: Poorly suited
Management concerns: Heintooga—slope, erodibility, large stones, seeps and springs, frost action, and differential settling; Chiltoskie—slope, erodibility, large stones, seeps and springs, and frost action
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Excavations unearth large stones and boulders.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- The Heintooga soil is subject to uneven settling and may be unstable if not properly compacted.
- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, large stones, climate, pesticide retention, and soil fertility
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope,

the very stony surface, and the high content of rock fragments in the Northcove soil.

- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: VIIs

HpA—Hemphill clay loam, 0 to 3 percent slopes, rarely flooded

Setting

Landscape: Mountain valleys of low mountains; dominantly in the Shelton Laurel and Spring Creeks areas and in the intermountain hills and low mountains in the northwestern and southeastern parts of the county
Elevation range: 1,250 to 2,250 feet
Landform: Low stream terraces
Landform position: Planar to slightly concave bottomland slopes
Shape of areas: Irregular
Size of areas: As much as 11 acres

Composition

Hemphill soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 13 inches—very dark grayish brown clay loam

Subsoil:
13 to 38 inches—dark gray clay

Underlying material:
38 to 80 inches—grayish brown gravelly fine sandy loam that has mottles in shades of brown and red

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Very poorly drained
General texture class: Clayey
Permeability: Moderately slow in the surface layer, slow in the subsoil, and moderate in the underlying material
Available water capacity: High

Depth to seasonal high water table: 1.0 foot or less from December through May and 0.5 foot to 1.5 feet from June through November
Hazard of flooding: Rare; throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Nearly level
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: None or slight
Organic matter content of surface layer: High
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, which allows late spring and early fall frost
Soil reaction: Very strongly acid to neutral throughout the profile
Parent material: Alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Moderately well drained Dillard soils that have more clay in the subsoil than the Hemphill soil; on low stream terraces and toeslopes
- Random areas of soils that have thinner and lighter-colored surface layers than the Hemphill soil and have less clay in the subsoil
- Well drained Tate soils on footslopes and Statler soils on low terraces
- Soils that have a rare flooding hazard; in the center of wide map units and adjacent to toeslopes
- Well drained Rosman soils that have loamy subsoils; along stream channels
- Somewhat poorly drained French soils that have less clay in the subsoil than the Hemphill soil; along stream channels
- Poorly drained Ela soils that have strata with a high content of rock fragments at a depth of 20 to more than 40 inches; in depressions and backwater areas
- Random areas of soils with slopes of more than 3 percent

Similar inclusions:
- Hemphill soils that have loam and sandy clay loam surface textures

Land Use

Dominant Uses: Pasture and hayland
Other Uses: Cropland and wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the wetness and flooding. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Flooding, wetness, pesticide retention, soil fertility, nutrient leaching, and erodibility

Management measures and considerations:

- Although most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- Maintaining existing drainageways and ditches helps to remove excess water.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer and the clay content of the subsoil. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to prevent the leaching of plant nutrients below the rooting zone and into the water table.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for orchard and ornamental crops because of wetness and flooding. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for timber production because of wetness and flooding. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for dwellings because of flooding and wetness. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for septic tank absorption fields because of flooding and wetness. Contact the local Health Department for additional guidance.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for roads and streets because of wetness and flooding. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for lawns and landscaping because of wetness and flooding. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: IIIw

JbD—Junaluska-Brasstown complex, 15 to 30 percent slopes

Setting

Landscape: Low and intermediate mountains; dominantly in the Shelton Laurel, Shut-in Creek, and Walnut communities
Elevation range: 1,400 to 3,500 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow or irregular
Size of areas: As much as 49 acres

Composition

Junaluska soil and similar inclusions: 50 percent
Brasstown soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Junaluska

Surface layer:
0 to 2 inches—dark yellowish brown fine sandy loam
2 to 11 inches—yellowish brown fine sandy loam

Subsoil:
11 to 21 inches—yellowish red sandy clay loam
21 to 26 inches—yellowish red fine sandy loam

Bedrock:
26 to 80 inches—weathered metaconglomerate

Brasstown

Surface layer:
0 to 6 inches—dark brown loam

Subsoil:
6 to 36 inches—yellowish red loam

Bedrock:
36 to 80 inches—weathered metasandstone

Soil Properties and Qualities

Depth class: Junaluska—moderately deep; Brasstown—deep
Drainage class: Well drained
General texture class: Loamy

Permeability: Moderate
Available water capacity: Moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum weathered from low-grade metasedimentary rock
Depth to bedrock: Junaluska—20 to 40 inches to soft bedrock; Brasstown—40 to 60 inches to soft bedrock

Minor Components

Dissimilar inclusions:

- Random areas of Soco and Stecoah soils that have less clay in the subsoil than the Junaluska and Brasstown soils and have soft bedrock at a depth of 20 to 60 inches
- Maymead soils that have bedrock at a depth of more than 60 inches; in saddles, gaps, and concave areas at the head of drains
- Cataska and Sylco soils that have less clay and more rock fragments in the subsoil than the Junaluska and Brasstown soils and have bedrock at a depth of 10 to 40 inches; on shoulder slopes and adjacent to widely scattered areas of rock outcrop
- Widely scattered areas of rock outcrop on narrow ridges
- Random areas of soils on slopes of less than 15 percent or more than 30 percent

Similar inclusions:

- Junaluska and Brasstown soils that have sandy loam and fine sandy loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture, hayland, cropland, building site development, and recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Suited
Management concerns: Junaluska—equipment use, erodibility, soil fertility, rooting depth, and droughtiness; Brasstown—equipment use, erodibility, soil fertility, and rooting depth
Management measures and considerations:

- The slope limits equipment use in the steeper areas.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.

- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Junaluska soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Poorly suited

Management concerns: Junaluska—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness; Brasstown—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, and rooting depth

Management measures and considerations:

- These soils are difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent fracture of the ball and separation of the soil from the roots caused by low moisture and minimal clay content.
- The slope affects the shape of ornamentals on the uphill side.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity, windthrow hazard, and the moderately deep rooting depth, areas of the Junaluska soil are difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Low or moderate for upland hardwoods and high for eastern white pine

Suitability: Suited

Management concerns: Junaluska—equipment use, erodibility, rooting depth, and windthrow hazard; Brasstown—equipment use, erodibility, and rooting depth

Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content in the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Productivity is limited in areas of the Junaluska soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:

- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Brasstown soil may improve the performance of filter fields.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, low strength, erodibility, depth to bedrock, and frost action
Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.
- The soft bedrock underlying the soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Junaluska—slope, erodibility, soil fertility, depth to bedrock, and droughtiness; Brasstown—slope, erodibility, soil fertility, and depth to bedrock
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.

- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Junaluska soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock needs to be removed.

Interpretive Group

Land capability classification: IVe

JbE—Junaluska-Brasstown complex, 30 to 50 percent slopes

Setting

Landscape: Low and intermediate mountains; dominantly in the Shelton Laurel, Shut-in Creek, and Walnut communities
Elevation range: 1,400 to 3,500 feet
Landform: Ridges
Landform position: Summits and side slopes
Shape of areas: Irregular or long and narrow on summits and irregular on side slopes
Size of areas: As much as 179 acres

Composition

Junaluska soil and similar inclusions: 50 percent
Brasstown soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Junaluska

Surface layer:
0 to 2 inches—dark yellowish brown fine sandy loam
2 to 11 inches—yellowish brown fine sandy loam

Subsoil:
11 to 21 inches—yellowish red sandy clay loam
21 to 26 inches—yellowish red fine sandy loam

Bedrock:
26 to 80 inches—weathered metaconglomerate

Brasstown

Surface layer:
0 to 6 inches—dark brown loam

Subsoil:
6 to 36 inches—yellowish red loam

Bedrock:
36 to 80 inches—weathered metasandstone

Soil Properties and Qualities

Depth class: Junaluska—moderately deep; Brasstown—deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: Junaluska—20 to 40 inches to soft bedrock; Brasstown—40 to 60 inches to soft bedrock

Minor Components

Dissimilar inclusions:

- Random areas of Soco and Stecoah soils that have less clay in the subsoil than the Junaluska and Brasstown soils and have soft bedrock at a depth of 20 to 60 inches
- Maymead soils that have bedrock at a depth of more than 60 inches; in saddles, gaps, and concave areas at the head of drains
- Northcove soils that have more rock fragments in the subsoil than the Junaluska and Brasstown soils and have bedrock at a depth of more than 60 inches; in drainageways, on toeslopes, on benches, and below rock outcrops
- Cataska and Sylco soils that have less clay and more rock fragments in the subsoil than the Junaluska and Brasstown soils and have bedrock at a depth of 10 to 40 inches; on shoulder slopes and adjacent to widely scattered areas of rock outcrop
- Cheoah and Jeffrey soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Random areas of soils on slopes of less than 30 percent or more than 50 percent

Similar inclusions:

- Junaluska and Brasstown soils that have sandy loam and fine sandy loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture, recreation, and building site development

Agricultural Development

Cropland

Suitability: Unsuited

Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management concerns: Junaluska—equipment use, erodibility, soil fertility, rooting depth, and droughtiness; Brasstown—equipment use, erodibility, soil fertility, and rooting depth
Management measures and considerations:
- Because of the slope, this map unit is difficult to manage for pasture or hayland.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Junaluska soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Junaluska—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness; Brasstown—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness
Management measures and considerations:
- These soils are difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent fracture of the ball and separation of the soil from the roots caused by low available moisture and minimal clay content.
- The slope affects the shape of ornamentals on the uphill side.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity, windthrow hazard, and the moderately deep rooting depth, areas of the Junaluska soil are difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Low or moderate for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Junaluska—equipment use, erodibility, and windthrow hazard; Brasstown—equipment use and erodibility
Management measures and considerations:
- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content in the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Productivity is limited in areas of the Junaluska soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Brasstown soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, low strength, erodibility, depth to bedrock, and frost action
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, helps to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.

- The soft bedrock underlying the soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Junaluska—slope, erodibility, droughtiness, soil fertility, and depth to bedrock; Brasstown—slope, erodibility, droughtiness, and soil fertility
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Junaluska soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock needs to be removed.

Interpretive Group

Land capability classification: VIe

JbF—Junaluska-Brasstown complex, 50 to 95 percent slopes

Setting

Landscape: Low and intermediate mountains; dominantly in the Shelton Laurel, Shut-in Creek, and Walnut communities
Elevation range: 1,400 to 3,500 feet
Landform: South- to west-facing mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: As much as 49 acres

Composition

Junaluska soil and similar inclusions: 50 percent
Brasstown soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Junaluska

Surface layer:
0 to 2 inches—dark yellowish brown fine sandy loam
2 to 11 inches—yellowish brown fine sandy loam

Subsoil:
11 to 21 inches—yellowish red sandy clay loam
21 to 26 inches—yellowish red fine sandy loam

Bedrock:
26 to 80 inches—weathered metaconglomerate

Brasstown

Surface layer:
0 to 6 inches—dark brown loam

Subsoil:
6 to 36 inches—yellowish red loam

Bedrock:
36 to 80 inches—weathered metasandstone

Soil Properties and Qualities

Depth class: Junaluska—moderately deep; Brasstown—deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Medium
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: Junaluska—20 to 40 inches to soft bedrock; Brasstown—40 to 60 inches to soft bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Random areas of Soco and Stecoah soils that have less clay in the subsoil than the Junaluska and Brasstown soils and have soft bedrock at a depth of 20 to 60 inches
- Maymead soils that have bedrock at a depth of more than 60 inches; in saddles, gaps, and concave areas at the head of drains
- Northcove soils that have more rock fragments in the subsoil than the Junaluska and Brasstown soils and have bedrock at a depth of more than 60 inches; in drainageways, on toeslopes, on benches, and below rock outcrops
- Cataska and Sylco soils that have less clay and more rock fragments in the subsoil than the Junaluska and Brasstown soils and have bedrock at a depth of 10 to 40 inches; on shoulder slopes and adjacent to widely scattered areas of rock outcrop
- Ditney soils that have less clay in the subsoil than the Junaluska and Brasstown soils and have hard bedrock at a depth of 20 to 40 inches; on spur ridges
- Cheoah and Jeffrey soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Random areas of soils on slopes of less than 50 percent or more than 95 percent

Similar inclusions:
- Junaluska and Brasstown soils that have sandy loam and fine sandy loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Low or moderate for upland hardwoods and high for eastern white pine
Suitability: Poorly suited
Management concerns: Junaluska—equipment use, erodibility, and windthrow hazard; Brasstown—equipment use and erodibility
Management measures and considerations:
- Using cable logging methods helps to overcome equipment limitations and prevents the acceleration of erosion caused by road construction, skid trails, and disturbance of the forest floor by heavy machinery.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Junaluska soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope and depth to bedrock. Contact the local Health Department for additional guidance.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: VIIe

KnC—Keener loam, 8 to 15 percent slopes, stony

Setting

Landscape: Low and intermediate mountains in the Grass Creek area on the Cocke County, Tennessee line in the western part of the county
Elevation range: 1,400 to 1,800 feet
Landform: Coves
Landform position: Footslopes
Shape of areas: Irregular
Size of areas: 1 acre (unit is a join to Cocke County, Tennessee)

Composition

Keener soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 7 inches—dark grayish brown loam

Subsoil:
7 to 38 inches—strong brown clay loam

Underlying material:
38 to 80 inches—yellowish brown and very pale brown very gravelly loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid in the surface layer, moderate in the subsoil, and moderately rapid in the underlying material
Available water capacity: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: High
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, which allows late spring and early fall frost
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Colluvium derived from low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Random areas of Maymead soils that have less clay in the subsoil than the Keener soil; in drainageways
- Random areas of soils on slopes of less than 8 percent or more than 15 percent

Similar inclusions:
- Keener soils that have sandy loam and fine sandy loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Erodibility, equipment use, climate, tilth, pesticide retention, and soil fertility
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit equipment use in the steeper areas.

- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, equipment use, pesticide retention, and soil fertility
Management measures and considerations:
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- The slope may limit equipment use in the steeper areas when harvesting hay crops.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Well suited
Management concerns: Erodibility, equipment use, climate, pesticide retention, and soil fertility
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit equipment use in the steeper areas.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods; high for eastern white pine
Suitability: Well suited
Management concerns: Equipment use and erodibility
Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due the high content of organic matter in the surface layer and the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Slope, erodibility, seeps and springs, corrosivity, and large stones
Management measures and considerations:

- Designing structures so that they conform with natural slopes helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Excavations may unearth large stones and boulders.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, slope, seeps and springs, and large stones
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Excavations may unearth large stones and boulders.

Local roads and streets

Suitability: Suited

Management concerns: Low strength, slope, erodibility, frost action, seeps and springs, and large stones

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting roadbeds help to improve soil strength.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- Excavations may unearth large stones and boulders.

Lawns and landscaping

Suitability: Suited

Management concerns: Slope, erodibility, soil compaction, climate, pesticide retention, and soil fertility

Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: IIIe

MwC—Mars Hill-Walnut complex, 8 to 15 percent slopes, stony

Setting

Landscape: Low and intermediate mountains; dominantly in the southeastern and south-central parts of the county

Elevation range: 2,000 to 3,500 feet

Landform: Ridges
Landform position: Summits
Shape of areas: Long and narrow or irregular
Size of areas: As much as 6 acres

Composition

Mars Hill soil and similar inclusions: 55 percent
Walnut soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Mars Hill

Surface layer:
0 to 3 inches—dark yellowish fine sandy loam
3 to 9 inches—dark yellowish brown fine sandy loam

Subsoil:
9 to 35 inches—dark yellowish brown fine sandy loam

Underlying material:
35 to 46 inches—dark yellowish brown fine sandy loam saprolite

Bedrock:
46 to 80 inches—weathered, migmatitic gneiss bedrock

Walnut

Surface layer:
0 to 2 inches—brown fine sandy loam
2 to 9 inches—dark yellowish brown fine sandy loam

Subsoil:
9 to 21 inches—strong brown loam
21 to 27 inches—strong brown gravelly fine sandy loam

Bedrock:
27 to 80 inches—weathered, migmatitic gneiss bedrock

Soil Properties and Qualities

Depth class: Mars Hill—deep; Walnut—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Mars Hill—moderate; Walnut—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Very strongly acid to neutral throughout the profile

Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock

Depth to bedrock: Mars Hill—40 to 60 inches to soft bedrock; Walnut—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:

- Random areas of Oteen soils that have soft bedrock at a depth of 10 to 20 inches
- Cowee and Evard soils that have more clay in the subsoil than the Mars Hill and Walnut soils and have soft bedrock at a depth of 20 to more than 60 inches; on shoulder slopes and nose slopes
- Random areas of soils that have more mica in the subsoil than the Mars Hill and Walnut soils and have soft bedrock at a depth of 20 to more than 60 inches
- Tate soils that have thicker surface layers with more organic matter, have more clay in the subsoil, and have bedrock at a depth of more than 60 inches; in saddles and gaps
- Random areas of soils that are similar to Clifton soils but that have soft bedrock at a depth of less than 60 inches
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of soils on slopes of less than 8 percent or more than 15 percent

Similar inclusions:

- Mars Hill and Walnut soils that have sandy loam and loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat

Other Uses: Pasture, hayland, cropland, and building site development

Agricultural Development

Cropland

Suitability: Poorly suited

Management concerns: Mars Hill—erodibility, equipment use, soil fertility, and rooting depth; Walnut—erodibility, equipment use, soil fertility, rooting depth, and droughtiness

Management measures and considerations:

- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit equipment use in the steeper areas.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Walnut soil is difficult to manage for cultivated crops.

Pasture and hayland

Suitability: Suited

Management concerns: Mars Hill—erodibility, equipment use, soil fertility, and rooting depth; Walnut—erodibility, equipment use, soil fertility, rooting depth, and droughtiness

Management measures and considerations:

- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- The slope limits equipment use in the steeper areas.

- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Walnut soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Mars Hill—erodibility, equipment use, soil fertility, ball and burlap harvesting, and rooting depth; Walnut—erodibility, equipment use, soil fertility, ball and burlap harvesting, rooting depth, and droughtiness
Management measures and considerations:

- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit equipment use in the steeper areas.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent fracture of the ball and separation of the soil from the roots caused by low moisture and minimal clay content.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity, windthrow hazard, and the moderately deep rooting depth, areas of the Walnut soil are difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Mars Hill—equipment use and erodibility; Walnut—equipment use, erodibility, and windthrow hazard
Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Walnut soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, corrosivity, and depth to bedrock

Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials for foundations and basements helps to reduce the risk of damage to concrete.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Mars Hill soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, slippage, erodibility, depth to bedrock, and frost action
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible helps to prevent slippage and excessive soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Mars Hill—slope, erodibility, soil fertility, and depth to bedrock;
Walnut—slope, erodibility, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- Because of the moderately deep rooting depth, the Walnut soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock needs to be removed.
- In areas where water concentrates, such as drainageways, Fraser fir and other

ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: IIIe

MwD—Mars Hill-Walnut complex, 15 to 30 percent slopes, stony

Setting

Landscape: Low and intermediate mountains; dominantly in the southeastern and south-central parts of the county
Elevation range: 2,000 to 3,500 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow or irregular
Size of areas: As much as 125 acres

Composition

Mars Hill soil and similar inclusions: 55 percent
Walnut soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Mars Hill

Surface layer:
0 to 3 inches—dark yellowish brown fine sandy loam
3 to 9 inches—dark yellowish brown fine sandy loam

Subsoil:
9 to 35 inches—dark yellowish brown fine sandy loam

Underlying material:
35 to 46 inches—dark yellowish brown fine sandy loam saprolite

Bedrock:
46 to 80 inches—weathered, migmatitic gneiss bedrock

Walnut

Surface layer:
0 to 2 inches—brown fine sandy loam
2 to 9 inches—dark yellowish brown fine sandy loam

Subsoil:
9 to 21 inches—strong brown loam
21 to 27 inches—strong brown gravelly fine sandy loam

Bedrock:
27 to 80 inches—weathered, migmatitic gneiss bedrock

Soil Properties and Qualities

Depth class: Mars Hill—deep; Walnut—moderately deep
Drainage class: Well drained
General texture class: Loamy

Permeability: Moderately rapid
Available water capacity: Mars Hill—moderate; Walnut—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Very strongly acid to neutral throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Mars Hill—40 to 60 inches to soft bedrock; Walnut—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Random areas of Oteen soils that have soft bedrock at a depth of 10 to 20 inches
- Cowee and Evard soils that have more clay in the subsoil than the Mars Hill and Walnut soils and have soft bedrock at a depth of 20 to more than 60 inches; on shoulder slopes and nose slopes
- Random areas of soils that have more mica in the subsoil than the Mars Hill and Walnut soils and have soft bedrock at a depth of 20 to more than 60 inches
- Tate soils that have thicker surface layers with more organic matter, have more clay in the subsoil, and have bedrock at a depth of more than 60 inches; in saddles and gaps
- Random areas of soils that are similar to Clifton soils but that have soft bedrock at a depth of less than 60 inches
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of soils on slopes of less than 15 percent or more than 30 percent
- Widely scattered areas of rock outcrop on narrow ridges

Similar inclusions:
- Mars Hill and Walnut soils that have sandy loam and loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture, hayland, cropland, and building site development

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Suited

Management concerns: Mars Hill—equipment use, erodibility, soil fertility, and rooting depth; Walnut—equipment use, erodibility, soil fertility, rooting depth, and droughtiness

Management measures and considerations:

- The slope limits equipment use in the steeper areas.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, areas of the Walnut soil are difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Poorly suited

Management concerns: Mars Hill—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, and rooting depth; Walnut—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness

Management measures and considerations:

- These soils are difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent fracture of the ball and separation of the soil from the roots caused by low moisture and minimal clay content.
- The slope affects the shape of ornamentals on the uphill side.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity, windthrow hazard, and the moderately deep rooting depth, areas of the Walnut soil are difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine

Suitability: Suited

Management concerns: Mars Hill—equipment use and erodibility; Walnut—equipment use, erodibility, and windthrow hazard

Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.

- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Walnut soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:

- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials for foundations and basements helps to reduce the risk of damage to concrete.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Mars Hill soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, slippage, erodibility, depth to bedrock, and frost action
Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Mars Hill—slope, erodibility, droughtiness, soil fertility, and depth to bedrock; Walnut—slope, erodibility, droughtiness, soil fertility, depth to bedrock, and droughtiness

Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- Because of the moderately deep rooting depth, the Walnut soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock needs to be removed.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: IVe

MwE—Mars Hill-Walnut complex, 30 to 50 percent slopes, stony

Setting

Landscape: Low and intermediate mountains; dominantly in the southeastern and south-central parts of the county
Elevation range: 2,000 to 3,500 feet
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: As much as 636 acres

Composition

Mars Hill soil and similar inclusions: 55 percent
Walnut soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Mars Hill

Surface layer:
0 to 3 inches—dark yellowish brown fine sandy loam
3 to 9 inches—dark yellowish brown fine sandy loam

Subsoil:
9 to 35 inches—dark yellowish brown fine sandy loam

Underlying material:
35 to 46 inches—dark yellowish brown fine sandy loam saprolite

Bedrock:
46 to 80 inches—weathered, migmatitic gneiss bedrock

Walnut

Surface layer:
0 to 2 inches—brown fine sandy loam
2 to 9 inches—dark yellowish brown fine sandy loam

Subsoil:
9 to 21 inches—strong brown loam
21 to 27 inches—strong brown gravelly fine sandy loam

Bedrock:
27 to 80 inches—weathered, migmatitic gneiss bedrock

Soil Properties and Qualities

Depth class: Mars Hill—deep; Walnut—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Mars Hill—moderate; Walnut—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Very strongly acid to neutral throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic, high-grade metamorphic or igneous rock
Depth to bedrock: Mars Hill—40 to 60 inches to soft bedrock; Walnut—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:

- Random areas of Oteen soils that have soft bedrock at a depth of 10 to 20 inches
- Random areas of soils that have more mica in the subsoil than the Mars Hill and Walnut soils and have soft bedrock at a depth of 20 to more than 60 inches
- Tate and Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Cowee and Evard soils that have more clay in the subsoil than the Mars Hill and Walnut soils and have soft bedrock at a depth of 20 to more than 60 inches; on shoulder slopes and nose slopes
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Random areas of soils on slopes of less than 30 percent or more than 50 percent
- Widely scattered areas of rock outcrop on narrow ridges and side slopes

Similar inclusions:

- Mars Hill and Walnut soils that have sandy loam and loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture, building site development, and recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management concerns: Mars Hill—equipment use, erodibility, soil fertility, and rooting depth; Walnut—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- Because of the slope, this map unit is difficult to manage for pasture or hayland.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Walnut soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Mars Hill—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, and rooting depth; Walnut—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness
Management measures and considerations:
- These soils are difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent fracture of the ball and separation of the soil from the roots caused by low moisture and minimal clay content.
- The slope affects the shape of ornamentals on the uphill side.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity, windthrow hazard, and the moderately deep rooting depth, areas of the Walnut soil are difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Mars Hill—equipment use and erodibility; Walnut—equipment use, erodibility, and windthrow hazard
Management measures and considerations:

- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Walnut soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:

- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials for foundations and basements helps to reduce the risk of damage to concrete.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Mars Hill soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, slippage, erodibility, depth to bedrock, and frost action

Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Mars Hill—slope, erodibility, droughtiness, soil fertility, and depth to bedrock; Walnut—slope, erodibility, droughtiness, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the moderately deep rooting depth, the Walnut soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock needs to be removed.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: VIe

MwF—Mars Hill-Walnut complex, 50 to 95 percent slopes, stony

Setting

Landscape: Low and intermediate mountains; dominantly in the southeastern and south-central parts of the county
Elevation range: 2,000 to 3,500 feet
Landform: Mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: As much as 325 acres

Composition

Mars Hill soil and similar inclusions: 55 percent
Walnut soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Mars Hill

Surface layer:
0 to 3 inches—dark yellowish brown fine sandy loam
3 to 9 inches—dark yellowish brown fine sandy loam

Subsoil:
9 to 35 inches—dark yellowish brown fine sandy loam

Underlying material:
35 to 46 inches—dark yellowish brown fine sandy loam saprolite

Bedrock:
46 to 80 inches—weathered, migmatitic gneiss bedrock

Walnut

Surface layer:
0 to 2 inches—brown fine sandy loam
2 to 9 inches—dark yellowish brown fine sandy loam

Subsoil:
9 to 21 inches—strong brown loam
21 to 27 inches—strong brown gravelly fine sandy loam

Bedrock:
27 to 80 inches—weathered, migmatitic gneiss bedrock

Soil Properties and Qualities

Depth class: Mars Hill—deep; Walnut—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Mars Hill—moderate; Walnut—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Medium
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Very strongly acid to neutral throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Mars Hill—40 to 60 inches to soft bedrock; Walnut—20 to 40 inches to soft bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Random areas of Oteen soils that have soft bedrock at a depth of 10 to 20 inches

- Random areas of soils that have more mica in the subsoil than the Mars Hill and Walnut soils and have soft bedrock at a depth of 20 to more than 60 inches
- Tate and Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Random areas of soils on slopes of less than 50 percent or more than 95 percent
- Cowee and Evard soils that have more clay in the subsoil than the Mars Hill and Walnut soils and have soft bedrock at a depth of 20 to more than 60 inches; on shoulder slopes and nose slopes
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Widely scattered areas of rock outcrop

Similar inclusions:
- Mars Hill and Walnut soils that have sandy loam and loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine
Suitability: Poorly suited
Management concerns: Mars Hill—equipment use and erodibility; Walnut—equipment use, erodibility, and windthrow hazard
Management measures and considerations:
- Using cable logging methods helps to overcome equipment limitations and prevents

the acceleration of erosion caused by road construction, skid trails, and disturbance of the forest floor by heavy machinery.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Walnut soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope and depth to bedrock. Contact the local Health Department for additional guidance.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: VIIe

MyB—Maymead-Northcove complex, 2 to 8 percent slopes, stony

Setting

Landscape: Low and intermediate mountains throughout the northwestern and north-central parts of the county
Elevation range: 1,500 to 3,250 feet
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Footslopes and toeslopes
Shape of areas: Long and narrow or irregular
Size of areas: As much as 6 acres

Composition

Maymead soil and similar inclusions: 65 percent
Northcove soil and similar inclusions: 25 percent
Dissimilar inclusions: 10 percent

Typical Profile

Maymead

Surface layer:
0 to 5 inches—very dark grayish brown loam

Subsoil:
5 to 80 inches—brown cobbly loam

Northcove

Surface layer:
0 to 3 inches—dark grayish brown very cobbly loam

Subsoil:
3 to 60 inches—brownish yellow very cobbly sandy loam

Underlying material:
60 to 80 inches—light yellowish brown very cobbly sandy loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Maymead—loamy; Northcove—loamy with many rock fragments
Permeability: Moderately rapid
Available water capacity: Maymead—moderate; Northcove—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Moderate
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Moderate or high
Potential frost action: Maymead—moderate; Northcove—low
Special climatic conditions: Soils subject to slow air drainage, which allows late spring and early fall frost
Soil reaction: Maymead—very strongly acid or strongly acid throughout the profile; Northcove—extremely acid to moderately acid throughout the profile
Parent material: Colluvium derived from low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soils subject to overland flow of storm water from adjacent uplands; high content of rock fragments in the Northcove soil

Minor Components

Dissimilar inclusions:
- Random areas of soils that have more clay in the subsoil than the Maymead and Northcove soils
- Soils that are poorly drained in areas of seeps and springs
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; in depressions and on toeslopes
- Areas that occasionally flood for very brief duration; along stream channels

- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways and on the outer edge of map unit delineations
- Random areas of soils on slopes of less than 2 percent or more than 8 percent

Similar inclusions:
- Maymead soils that have fine sandy loam and loam surface textures
- Northcove soils that have fine sandy loam and loam surface textures

Land Use

Dominant Uses: Cropland, pasture, hayland, and ornamental crops
Other Uses: Woodland, wildlife habitat, and recreation

Agricultural Development

Cropland

Suitability: Maymead—suited; Northcove—unsuited
Management concerns: Maymead—erodibility and soil fertility; Northcove—erodibility, soil fertility, and droughtiness
Management measures and considerations:
- This map unit is limited for crop production because of the high content of rock fragments in the Northcove soil.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Pasture and hayland

Suitability: Suited
Management concerns: Maymead—erodibility and soil fertility; Northcove—erodibility, soil fertility, and droughtiness
Management measures and considerations:
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- The Northcove soil is limited because of the high amount of rock fragments in the root zone.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.

Orchard and ornamental crops

Suitability: Maymead—suited; Northcove—unsuited
Management concerns: Ball and burlap harvesting, erodibility, soil fertility, and climate
Management measures and considerations:
- Avoiding ball and burlap harvesting during dry periods helps to prevent fracture of the ball and separation of the soil from the roots caused by low moisture and minimal clay content of the Maymead soil.

- The Northcove soil is severely limited for ball and burlap harvesting because of the high amount of rock fragments in the root zone.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Woodland Management and Productivity

Potential for commercial species: High for cove hardwoods
Suitability: Suited
Management concerns: Erodibility
Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.

Urban Development

Dwellings

Suitability: Maymead—suited; Northcove—unsuited
Management concerns: Maymead—large stones, erodibility, seeps and springs, and corrosivity; Northcove—large stones, erodibility, seeps and springs, corrosivity, and cutbanks cave
Management measures and considerations:

- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Excavations may unearth large stones and boulders.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete.
- Installing permanent retaining walls helps to improve soil stability.

Septic tank absorption fields

Suitability: Maymead—suited; Northcove—unsuited
Management concerns: Maymead—large stones and seeps and springs; Northcove—large stones, seeps and springs, and poor filtering capacity

Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may unearth large stones and boulders.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Measures that improve the filtering capacity should be considered; the Northcove soil readily absorbs but does not adequately filter effluent.

Local roads and streets

Suitability: Well suited
Management concerns: Maymead—erodibility, large stones, seeps and springs, and frost action; Northcove—erodibility, large stones, seeps and springs, frost action, and differential settling
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Excavations may unearth large stones and boulders.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- The Northcove soil is subject to uneven settling and may be unstable if not properly compacted.

Lawns and landscaping

Suitability: Maymead—suited; Northcove—poorly suited
Management concerns: Maymead—erodibility, large stones, soil fertility, climate, and pesticide retention; Northcove—erodibility, large stones, soil fertility, climate, pesticide retention, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- This map unit is limited for lawns and landscaping because of the high content of rock fragments in the Northcove soil.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: Maymead—IIIe; Northcove—VIIs

NhC—Northcove-Maymead complex, 8 to 15 percent slopes, stony

Setting

Landscape: Low and intermediate mountains throughout the northwestern and north-central parts of the county
Elevation range: 1,350 to 4,600 feet
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Footslopes and toeslopes
Shape of areas: Long and narrow or irregular
Size of areas: As much as 53 acres

Composition

Northcove soil and similar inclusions: 65 percent
Maymead soil and similar inclusions: 25 percent
Dissimilar inclusions: 10 percent

Typical Profile

Northcove

Surface layer:
0 to 3 inches—dark grayish brown very cobbly loam

Subsoil:
3 to 60 inches—brownish yellow very cobbly sandy loam

Underlying material:
60 to 80 inches—light yellowish brown very cobbly sandy loam

Maymead

Surface layer:
0 to 5 inches—very dark grayish brown loam

Subsoil:
5 to 80 inches—brown cobbly loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Northcove—loamy with many rock fragments; Maymead—loamy
Permeability: Moderately rapid
Available water capacity: Maymead—moderate; Northcove—low or moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Moderate or high

Potential frost action: Northcove—low; Maymead—moderate
Special climatic conditions: Soils subject to slow air drainage, which allows late spring and early fall frost
Soil reaction: Northcove—extremely acid to moderately acid throughout the profile; Maymead—very strongly acid or strongly acid throughout the profile
Parent material: Colluvium derived from low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soils subject to overland flow of storm water from adjacent uplands; high content of rock fragments in the Northcove soil

Minor Components

Dissimilar inclusions:
- Random areas of soils that have more clay in the subsoil than the Northcove and Maymead soils
- Soils that are poorly drained in areas of seeps and springs
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; in depressions and on toeslopes
- Areas that occasionally flood for very brief duration; along stream channels
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways and on the outer edge of map unit delineations
- Random areas of soils on slopes of less than 8 percent or more than 15 percent

Similar inclusions:
- Maymead soils that have fine sandy loam and loam surface textures
- Northcove soils that have fine sandy loam and loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Cropland, pasture, ornamental crops, building site development, and recreation

Agricultural Development

Cropland

Suitability: Northcove—unsuited; Maymead—suited
Management concerns: Equipment use, erodibility, soil fertility, and climate
Management measures and considerations:
- This map unit is severely limited for crop production because of the high content of rock fragments in the Northcove soil.
- The slope may limit equipment use in the steeper areas.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Pasture and hayland

Suitability: Suited
Management concerns: Erodibility, equipment use, pesticide retention, and soil fertility
Management measures and considerations:
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.

- The slope may limit equipment use in the steeper areas when harvesting hay crops.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Northcove—unsuited; Maymead—suited
Management concerns: Equipment use, ball and burlap harvesting, erodibility, climate, pesticide retention, and soil fertility
Management measures and considerations:

- This map unit is severely limited for orchard and ornamental crops because of the high content of rock fragments in the Northcove soil.
- The slope may limit equipment use in the steeper areas.
- Avoiding ball and burlap harvesting during dry periods helps to prevent fracture of the ball and separation of the soil from the roots caused by low moisture and the minimal clay content of the Maymead soil.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.

Woodland Management and Productivity

Potential for commercial species: High for cove hardwoods
Suitability: Suited
Management concerns: Equipment use and erodibility
Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.

Urban Development

Dwellings

Suitability: Northcove—poorly suited; Maymead—suited
Management concerns: Northcove—large stones, slope, erodibility, seeps and springs, corrosivity, and cutbanks cave; Maymead—large stones, slope, erodibility, seeps and springs, and corrosivity

Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Excavations unearth large stones and boulders.
- Designing structures so that they conform with natural slopes helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete.
- Installing permanent retaining walls helps to improve soil stability.

Septic tank absorption fields

Suitability: Northcove—unsuited; Maymead—suited
Management concerns: Northcove—large stones, slope, seeps and springs, and poor filtering capacity; Maymead—large stones, slope, and seeps and springs
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Excavations unearth large stones and boulders.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Measures that improve the filtering capacity should be considered; the Northcove soil readily absorbs but does not adequately filter effluent.

Local roads and streets

Suitability: Suited
Management concerns: Northcove—large stones, slope, erodibility, seeps and springs, and differential settling; Maymead—large stones, slope, erodibility, seeps and springs, and frost action
Management measures and considerations:
- Excavations unearth large stones and boulders.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- The Northcove soil is subject to uneven settling and may be unstable if not properly compacted.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Northcove—poorly suited; Maymead—suited
Management concerns: Large stones, slope, erodibility, climate, pesticide retention, and soil fertility
Management measures and considerations:
- This map unit is limited for lawns and landscaping because of the high content of rock fragments in the Northcove soil.

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: Northcove—VIIs; Maymead—IIIe

NtD—Northcove-Maymead complex, 15 to 30 percent slopes, very stony

Setting

Landscape: Low and intermediate mountains throughout the northwestern and north-central parts of the county
Elevation range: 1,350 to 4,600 feet
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes, footslopes, and toeslopes
Shape of areas: Long and narrow or irregular
Size of areas: As much as 80 acres

Composition

Northcove soil and similar inclusions: 60 percent
Maymead soil and similar inclusions: 30 percent
Dissimilar inclusions: 10 percent

Typical Profile

Northcove

Surface layer:
0 to 3 inches—dark grayish brown very cobbly loam

Subsoil:
3 to 60 inches—brownish yellow very cobbly sandy loam

Underlying material:
60 to 80 inches—light yellowish brown very cobbly sandy loam

Maymead

Surface layer:
0 to 5 inches—very dark grayish brown loam

Subsoil:
5 to 80 inches—brown cobbly loam

Soil Properties and Qualities

Depth class: Very deep

Drainage class: Well drained
General texture class: Northcove—loamy with many rock fragments; Maymead—loamy
Permeability: Moderately rapid
Available water capacity: Maymead—moderate; Northcove—low or moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Moderate or high
Potential frost action: Northcove—low; Maymead—moderate
Special climatic conditions: Soils subject to slow air drainage, which allows late spring and early fall frost
Soil reaction: Northcove—extremely acid to moderately acid throughout the profile; Maymead—very strongly acid or strongly acid throughout the profile
Parent material: Colluvium derived from low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soils subject to overland flow of storm water from adjacent uplands; high content of rock fragments in the Northcove soil

Minor Components

Dissimilar inclusions:
- Random areas of soils that have more clay in the subsoil than the Northcove and Maymead soils
- Soils that are poorly drained in areas of seeps and springs
- Areas of the Northcove soil where the surface fragments have been removed
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; in depressions and on toeslopes
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways and on the outer edge of map unit delineations
- Areas that rarely flood for very brief duration; along stream channels
- Random areas of soils on slopes of less than 15 percent or more than 30 percent

Similar inclusions:
- Maymead soils that have fine sandy loam and loam surface textures
- Northcove soils that have fine sandy loam and loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture, building site development, and recreation

Agricultural Development

Cropland

Suitability: Northcove—unsuited; Maymead—poorly suited

Management concerns: Equipment use, erodibility, soil fertility, pesticide retention, and climate

Management measures and considerations:

- This map unit is severely limited for crop production because of the slope, erodibility, the very stony surface, and the high content of rock fragments in the Northcove soil.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited

Management concerns: Equipment use, erodibility, pesticide retention, and soil fertility

Management measures and considerations:

- The slope and surface stones limit the use of equipment and may be hazardous.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Northcove—unsuited; Maymead—suited

Management concerns: Equipment use, ball and burlap harvesting, erodibility, climate, pesticide retention, and soil fertility

Management measures and considerations:

- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, very stony surface, and the high content of rock fragments in the Northcove soil.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.

Woodland Management and Productivity

Potential for commercial species: High for cove hardwoods

Suitability: Suited

Management concerns: Equipment use, erodibility, and pesticide retention

Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly

onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.

- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.

Urban Development

Dwellings

Suitability: Northcove—poorly suited; Maymead—suited
Management concerns: Northcove—slope, large stones, erodibility, seeps and springs, corrosivity, and cutbanks cave; Maymead—slope, large stones, erodibility, seeps and springs, and corrosivity
Management measures and considerations:

- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Designing structures so that they conform with natural slopes helps to improve soil performance.
- Excavations unearth large stones and boulders.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete.
- Installing permanent retaining walls helps to improve soil stability.

Septic tank absorption fields

Suitability: Northcove—unsuited; Maymead—suited
Management concerns: Northcove—slope, large stones, seeps and springs, and poor filtering capacity; Maymead—slope, large stones, and seeps and springs
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations unearth large stones and boulders.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Measures that improve the filtering capacity should be considered; the Northcove soil readily absorbs but does not adequately filter effluent.

Local roads and streets

Suitability: Poorly suited
Management concerns: Northcove—slope, erodibility, large stones, seeps and springs, and differential settling; Maymead—slope, erodibility, large stones, seeps and springs, and frost action
Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, helps to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.

- Excavations unearth large stones and boulders.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- The Northcove soil is subject to uneven settling and may be unstable if not properly compacted.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, large stones, climate, pesticide retention, and soil fertility
Management measures and considerations:

- This map unit is limited for lawns and landscaping because of the slope, the very stony surface, and the high content of rock fragments in the Northcove soil.
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: Northcove—VIIs; Maymead—VIs

NtE—Northcove-Maymead complex, 30 to 50 percent slopes, very stony

Setting

Landscape: Low and intermediate mountains throughout the northwestern and north-central parts of the county
Elevation range: 1,350 to 4,600 feet
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes and footslopes
Shape of areas: Long and narrow or irregular
Size of areas: As much as 267 acres

Composition

Northcove soil and similar inclusions: 45 percent
Maymead soil and similar inclusions: 35 percent
Dissimilar inclusions: 20 percent

Typical Profile

Northcove

Surface layer:
0 to 3 inches—dark grayish brown very cobbly loam

Subsoil:
3 to 60 inches—brownish yellow very cobbly sandy loam

Underlying material:
60 to 80 inches—light yellowish brown very cobbly sandy loam

Maymead

Surface layer:
0 to 5 inches—very dark grayish brown loam

Subsoil:
5 to 80 inches—brown cobbly loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Northcove—loamy with many rock fragments; Maymead—loamy
Permeability: Moderately rapid
Available water capacity: Maymead—moderate; Northcove—low or moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Northcove—medium; Maymead—low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Moderate or high
Potential frost action: Northcove—low; Maymead—moderate
Special climatic conditions: Soils subject to slow air drainage, which allows late spring and early fall frosts
Soil reaction: Northcove—extremely acid to moderately acid throughout the profile; Maymead—very strongly acid or strongly acid throughout the profile
Parent material: Colluvium derived from low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soils subject to overland flow of storm water from adjacent uplands; high content of rock fragments in the Northcove soil; soil slippage potential when the soil is saturated

Minor Components

Dissimilar inclusions:
- Areas of rubble land below rock outcrops and in drainageways
- Random areas of soils that have more clay in the subsoil than the Northcove and Maymead soils
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; in depressions and on toeslopes
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways and on the outer edge of map unit delineations
- Random areas of soils on slopes of less than 30 percent or more than 50 percent

Similar inclusions:
- Maymead soils that have fine sandy loam and loam surface textures
- Northcove soils that have fine sandy loam and loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation, building site development, and pasture

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and the very stony surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management concerns: Equipment use, erodibility, pesticide retention, and soil fertility
Management measures and considerations:
- The slope and surface stones limit the use of equipment and may be hazardous.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, the very stony surface, and the high content of rock fragments in the Northcove soil. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: High for cove hardwoods
Suitability: Suited
Management concerns: Equipment use and erodibility
Management measures and considerations:
- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.

Urban Development

Dwellings

Suitability: Northcove—unsuited; Maymead—poorly suited
Management concerns: Northcove—slope, large stones, erodibility, seeps and springs, corrosivity, and cutbanks cave; Maymead—slope, large stones, erodibility, seeps and springs, and corrosivity
Management measures and considerations:

- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Excavations unearth large stones and boulders.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing permanent retaining walls helps to improve soil stability.

Septic tank absorption fields

Suitability: Northcove—unsuited; Maymead—poorly suited
Management concerns: Northcove—large stones, slope, seeps and springs, and poor filtering capacity; Maymead—large stones, slope, and seeps and springs
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Excavations unearth large stones and boulders.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Measures that improve the filtering capacity should be considered; the Northcove soil readily absorbs but does not adequately filter the effluent.

Local roads and streets

Suitability: Poorly suited
Management concerns: Northcove—slope, erodibility, large stones, seeps and springs, and differential settling; Maymead—slope, erodibility, large stones, seeps and springs, and frost action
Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible helps to prevent slippage and excessive soil erosion.
- Excavations unearth large stones and boulders.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- The Northcove soil is subject to uneven settling and may be unstable if not properly compacted.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, large stones, climate, pesticide retention, and soil fertility
Management measures and considerations:

- This map unit is severely limited for lawns and landscaping because of the slope, the very stony surface, and the high content of rock fragments of the Northcove soil.
- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: Northcove—VIIs; Maymead—VIe

OwC—Oconaluftee-Guyot-Cataloochee complex, windswept, 8 to 15 percent slopes, bouldery

Setting

Landscape: High mountains at Sandymush Bald in the southwestern part of the county
Elevation range: 4,800 to 5,150 feet
Landform: Ridges
Landform position: Summits
Shape of areas: Long and narrow or irregular
Size of areas: As much as 2 acres

Composition

Oconaluftee soil and similar inclusions: 45 percent
Guyot soil and similar inclusions: 25 percent
Cataloochee soil and similar inclusions: 20 percent
Dissimilar inclusions: 10 percent

Typical Profile

Oconaluftee

Surface layer:
0 to 12 inches—very dark brown channery clay loam

Subsoil:
12 to 44 inches—dark yellowish brown channery loam

Underlying material:
44 to 80 inches—multicolored fine sandy loam saprolite

Guyot

Surface layer:
0 to 11 inches—very dark brown clay loam

Subsoil:
11 to 28 inches—yellowish brown fine sandy loam

Underlying material:
28 to 54 inches—multicolored fine sandy loam saprolite

Bedrock:
54 to 80 inches—weathered, interbedded metasandstone and phyllite

Cataloochee

Surface layer:
0 to 9 inches—very dark brown clay loam

Subsoil:
9 to 19 inches—dark yellowish brown channery loam

Underlying material:
19 to 31 inches—dark yellowish brown channery fine sandy loam saprolite

Bedrock:
31 to 80 inches—weathered, interbedded metasandstone and phyllite

Soil Properties and Qualities

Depth class: Oconaluftee—very deep; Guyot—deep; Cataloochee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate in the surface layer and moderately rapid the subsoil and underlying material
Available water capacity: Oconaluftee and Guyot—moderate; Cataloochee—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Rock fragments on the surface: Widely scattered surface stones and boulders that average about 10 to 48 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and frequent rime ice in winter, high winds, and a short growing season
Soil reaction: Oconaluftee—extremely acid to strongly acid in the A horizon and extremely acid to moderately acid in the B and C horizons; Guyot—extremely acid in the A horizon, extremely acid to very strongly acid in the B horizon, and very strongly acid in the C horizon; Cataloochee—extremely acid in the A horizon, extremely acid to very strongly acid in the B horizon, and very strongly acid or strongly acid in the C horizon
Parent material: Residuum weathered from low-grade metasedimentary rock
Depth to bedrock: Oconaluftee—more than 60 inches; Guyot—40 to 60 inches to soft bedrock; Cataloochee—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Soils that have hard bedrock at a depth of 10 to 20 inches; adjacent to rock outcrops
- Widely scattered areas of rock outcrop
- Chiltoskie soils that have loamy subsoils and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and in saddles and gaps
- Random areas of soils on slopes of less than 8 percent or more than 15 percent

Similar inclusions:
- Oconaluftee soils that have fine sandy loam, sandy loam, and clay loam surface textures
- Guyot and Cataloochee soils that have fine sandy loam, sandy loam, and loam surface textures

Land Use

Dominant Uses: Pasture and wildlife habitat
Other Uses: Recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, damaging high winds, and short growing season. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Oconaluftee and Guyot—equipment use, erodibility, climate, pesticide retention, soil fertility, and rooting depth; Cataloochee—equipment use, erodibility, climate, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- Limitations affecting pasture and hayland are the slope, erodibility, the bouldery surface, damaging high winds, and short growing season.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Cataloochee soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Unsuited

Management measures and considerations:

- This map unit is severely limited for orchard and ornamental crops because of damaging high winds, a short growing season, depth to bedrock, and droughtiness in areas of the Cataloochee soil. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for timber production because of damaging high winds, a short growing season, and the depth to bedrock in the Cataloochee soil. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Oconaluftee—slope, erodibility, climate, and corrosivity; Guyot and Cataloochee—slope, erodibility, climate, corrosivity, and depth to bedrock
Management measures and considerations:

- Designing structures so that they conform with natural slopes helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Design modifications are needed to overcome the limitation of prolonged freezing temperatures and damaging high winds.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Oconaluftee—slope and climate; Guyot and Cataloochee—slope, climate, and depth to bedrock
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Design modifications are needed to overcome the limitation of prolonged freezing temperatures.
- Locating and using areas of the deeper Oconaluftee soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Oconaluftee—slope, erodibility, and frost action; Guyot and Cataloochee—slope, erodibility, frost action, and depth to bedrock
Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding

the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Oconaluftee and Guyot—slope, erodibility, climate, pesticide retention, soil fertility, and depth to bedrock; Cataloochee—slope, erodibility, climate, pesticide retention, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Due to a short growing season, the use of native, winter-hardy landscape plants is recommended.
- This map unit is subject to damaging high winds and may be unsuitable for some types of landscaping.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- In areas where water concentrates, ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Cataloochee soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Group

Land capability classification: IVc

OwD—Oconaluftee-Guyot-Cataloochee complex, windswept, 15 to 30 percent slopes, bouldery

Setting

Landscape: High mountains at Sandymush Bald in the southwestern part of the county
Elevation range: 4,800 to 5,150 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow or irregular
Size of areas: As much as 10 acres

Composition

Oconaluftee soil and similar inclusions: 45 percent
Guyot soil and similar inclusions: 25 percent
Cataloochee soil and similar inclusions: 20 percent
Dissimilar inclusions: 10 percent

Typical Profile

Oconaluftee

Surface layer:
0 to 12 inches—very dark brown channery clay loam

Subsoil:
12 to 44 inches—dark yellowish brown channery loam

Underlying material:
44 to 80 inches—multicolored fine sandy loam saprolite

Guyot

Surface layer:
0 to 11 inches—very dark brown clay loam

Subsoil:
11 to 28 inches—yellowish brown fine sandy loam

Underlying material:
28 to 54 inches—multicolored fine sandy loam saprolite

Bedrock:
54 to 80 inches—weathered, interbedded metasandstone and phyllite

Cataloochee

Surface layer:
0 to 9 inches—very dark brown clay loam

Subsoil:
9 to 19 inches—dark yellowish brown channery loam

Underlying material:
19 to 31 inches—dark yellowish brown channery fine sandy loam saprolite

Bedrock:
31 to 80 inches—weathered, interbedded metasandstone and phyllite

Soil Properties and Qualities

Depth class: Oconaluftee—very deep; Guyot—deep; Cataloochee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate in the surface layer and moderately rapid the subsoil and underlying material
Available water capacity: Oconaluftee and Guyot—moderate; Cataloochee—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Rock fragments on the surface: Widely scattered surface stones and boulders that average about 10 to 48 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Very high
Potential frost action: Moderate

Special climatic conditions: Soils subject to prolonged freezing temperatures and frequent rime ice in winter; high winds; a short growing season
Soil reaction: Oconaluftee—extremely acid to strongly acid in the A horizon and extremely acid to moderately acid in the B and C horizons; Guyot—extremely acid in the A horizon, extremely acid or very strongly acid in the B horizon, and very strongly acid in the C horizon; Cataloochee—extremely acid in the A horizon, extremely acid or very strongly acid in the B horizon, and very strongly acid or strongly acid in the C horizon
Parent material: Residuum weathered from low-grade metasedimentary rock
Depth to bedrock: Oconaluftee—more than 60 inches; Guyot—40 to 60 inches to soft bedrock; Cataloochee—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Soils that have hard bedrock at a depth of 10 to 20 inches; adjacent to rock outcrops
- Widely scattered areas of rock outcrop
- Chiltoskie soils that have loamy subsoils and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and in saddles and gaps
- Random areas of soils on slopes of less than 15 percent or more than 30 percent

Similar inclusions:
- Oconaluftee soils that have fine sandy loam, sandy loam, and clay loam surface textures
- Guyot and Cataloochee soils that have fine sandy loam, sandy loam, and loam surface textures

Land Use

Dominant Uses: Pasture and wildlife habitat
Other Uses: Recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, damaging high winds, and short growing season. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Oconaluftee and Guyot—equipment use, erodibility, climate, pesticide retention, soil fertility, and rooting depth; Cataloochee—equipment use, erodibility, climate, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- This map unit is limited for pasture and hayland because of the slope, erodibility, the bouldery surface, damaging high winds, and short growing season.
- The slope limits equipment use in the steeper areas.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase

the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.

- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Cataloochee soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for orchard and ornamental crops because of damaging high winds, a short growing season, depth to bedrock, and droughtiness in areas of the Cataloochee soil. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for timber production because of damaging high winds, a short growing season, low productivity, and depth to bedrock in areas of the Cataloochee soil. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Oconaluftee—slope, erodibility, climate, and corrosivity; Guyot and Cataloochee—slope, erodibility, climate, corrosivity, and depth to bedrock
Management measures and considerations:

- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Design modifications are needed to overcome the limitation of prolonged freezing temperatures and damaging high winds.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Oconaluftee—slope and climate; Guyot and Cataloochee—slope, climate, and depth to bedrock
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Design modifications are needed to overcome the limitation of prolonged freezing temperatures.

- Locating and using areas of the deeper Oconaluftee soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Oconaluftee—slope, erodibility, and frost action; Guyot and Cataloochee—slope, erodibility, frost action, and depth to bedrock
Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Oconaluftee and Guyot—slope, erodibility, climate, pesticide retention, soil fertility, and depth to bedrock; Cataloochee—slope, erodibility, climate, pesticide retention, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Due to a short growing season, the use of native, winter-hardy landscape plants is recommended.
- This map unit is subject to damaging high winds and may be unsuitable for some types of landscaping.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Cataloochee soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Group

Land capability classification: VIc

OwE—Oconaluftee-Guyot-Cataloochee complex, windswept, 30 to 50 percent slopes, bouldery

Setting

Landscape: High mountains at Sandymush Bald in the southwestern part of the county
Elevation range: 4,800 to 5,100 feet

Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow or irregular
Size of areas: As much as 31 acres

Composition

Oconaluftee soil and similar inclusions: 35 percent
Guyot soil and similar inclusions: 30 percent
Cataloochee soil and similar inclusions: 25 percent
Dissimilar inclusions: 10 percent

Typical Profile

Oconaluftee

Surface layer:
0 to 12 inches—very dark brown channery clay loam

Subsoil:
12 to 44 inches—dark yellowish brown channery loam

Underlying material:
44 to 80 inches—multicolored fine sandy loam saprolite

Guyot

Surface layer:
0 to 11 inches—very dark brown clay loam

Subsoil:
11 to 28 inches—yellowish brown fine sandy loam

Underlying material:
28 to 54 inches—multicolored fine sandy loam saprolite

Bedrock:
54 to 80 inches—weathered, interbedded metasandstone and phyllite

Cataloochee

Surface layer:
0 to 9 inches—very dark brown clay loam

Subsoil:
9 to 19 inches—dark yellowish brown channery loam

Underlying material:
19 to 31 inches—dark yellowish brown channery fine sandy loam saprolite

Bedrock:
31 to 80 inches—weathered, interbedded metasandstone and phyllite

Soil Properties and Qualities

Depth class: Oconaluftee—very deep; Guyot—deep; Cataloochee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate in the surface layer and moderately rapid the subsoil and underlying material
Available water capacity: Oconaluftee and Guyot—moderate; Cataloochee—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None

Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface stones and boulders that average about 10 to 48 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and frequent rime ice in winter, high winds, and a short growing season
Soil reaction: Oconaluftee—extremely acid to strongly acid in the A horizon and extremely acid to moderately acid in the B and C horizons; Guyot—extremely acid in the A horizon, extremely acid or very strongly acid in the B horizon, and very strongly acid in the C horizon; Cataloochee—extremely acid in the A horizon, extremely acid or very strongly acid in the B horizon, and very strongly acid or strongly acid in the C horizon
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: Oconaluftee—more than 60 inches; Guyot—40 to 60 inches to soft bedrock; Cataloochee—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Random areas of soils that have a high mica content in the subsoil and underlying material
- Soils that have hard bedrock at a depth of 10 to 20 inches; adjacent to rock outcrops
- Widely scattered areas of rock outcrop
- Heintooga soils that have more rock fragments in the subsoil than the Oconaluftee, Guyot, and Cataloochee soils; in concave areas at the head of drains and in drainageways
- Chiltoskie soils that have loamy subsoils and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and in drainageways
- Random areas of soils on slopes of less than 30 percent or more than 50 percent

Similar inclusions:
- Oconaluftee soils that have fine sandy loam, sandy loam, and clay loam surface textures
- Guyot and Cataloochee soils that have fine sandy loam, sandy loam, and loam surface textures

Land Use

Dominant Uses: Wildlife habitat
Other Uses: Pasture and recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, damaging high winds, and short growing season. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management concerns: Oconaluftee and Guyot—equipment use, erodibility, climate, pesticide retention, soil fertility, and rooting depth; Cataloochee—equipment use, erodibility, climate, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:

- This map unit is severely limited for pasture and hayland because of the slope, erodibility, the bouldery surface, damaging high winds, and the short growing season.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Cataloochee soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, damaging high winds, short growing season, depth to bedrock, and the droughtiness in areas of the Cataloochee soil. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for timber production because of damaging high winds, a short growing season, low productivity, and the depth to bedrock in areas of the Cataloochee soil. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Oconaluftee—slope, erodibility, climate, and corrosivity; Guyot and Cataloochee—slope, erodibility, climate, corrosivity, and depth to bedrock
Management measures and considerations:

- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Design modifications are needed to overcome the limitation of prolonged freezing temperatures and damaging high winds.

- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Oconaluftee—slope and climate; Guyot and Cataloochee—slope, climate, and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Design modifications are needed to overcome the limitation of prolonged freezing temperatures.
- Locating and using areas of the deeper Oconaluftee soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Oconaluftee—slope, erodibility, and frost action; Guyot and Cataloochee—slope, erodibility, frost action, and depth to bedrock
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Oconaluftee and Guyot—slope, erodibility, climate, pesticide retention, soil fertility, and depth to bedrock; Cataloochee—slope, erodibility, climate, pesticide retention, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Due to a short growing season, the use of native, winter-hardy landscape plants is recommended.
- This map unit is subject to damaging high winds and may be unsuitable for some types of landscaping.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other

ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Cataloochee soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Group

Land capability classification: VIe

OwF—Oconaluftee-Guyot-Cataloochee complex, windswept, 50 to 95 percent slopes, bouldery

Setting

Landscape: High mountains at Sandymush Bald in the southwestern part of the county
Elevation range: 4,800 to 5,100 feet
Landform: Mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: As much as 56 acres

Composition

Oconaluftee soil and similar inclusions: 35 percent
Guyot soil and similar inclusions: 30 percent
Cataloochee soil and similar inclusions: 25 percent
Dissimilar inclusions: 10 percent

Typical Profile

Oconaluftee

Surface layer:
0 to 12 inches—very dark brown channery clay loam

Subsoil:
12 to 44 inches—dark yellowish brown channery loam

Underlying material:
44 to 80 inches—multicolored fine sandy loam saprolite

Guyot

Surface layer:
0 to 11 inches—very dark brown clay loam

Subsoil:
11 to 28 inches—yellowish brown fine sandy loam

Underlying material:
28 to 54 inches—multicolored fine sandy loam saprolite

Bedrock:
54 to 80 inches—weathered, interbedded metasandstone and phyllite

Cataloochee

Surface layer:
0 to 9 inches—very dark brown clay loam

Subsoil:
9 to 19 inches—dark yellowish brown channery loam

Underlying material:
19 to 31 inches—dark yellowish brown channery fine sandy loam saprolite

Bedrock:
31 to 80 inches—weathered, interbedded metasandstone and phyllite

Soil Properties and Qualities

Depth class: Oconaluftee—very deep; Guyot—deep; Cataloochee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate in the surface layer and moderately rapid the subsoil and underlying material
Available water capacity: Oconaluftee and Guyot—moderate; Cataloochee—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Medium
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface stones and boulders that average about 10 to 48 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and frequent rime ice in winter, high winds, and a short growing season
Soil reaction: Oconaluftee—extremely acid to strongly acid in the A horizon and extremely acid to moderately acid in the B and C horizons; Guyot—extremely acid in the A horizon, extremely acid or very strongly acid in the B horizon, and very strongly acid in the C horizon; Cataloochee—extremely acid in the A horizon, extremely acid or very strongly acid in the B horizon, and very strongly acid or strongly acid in the C horizon
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: Oconaluftee—more than 60 inches; Guyot—40 to 60 inches to soft bedrock; Cataloochee—20 to 40 inches to soft bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Random areas of soils that have a high mica content in the subsoil and underlying material
- Soils that have hard bedrock at a depth of 10 to 20 inches; adjacent to rock outcrops
- Widely scattered areas of rock outcrop
- Heintooga soils that have more rock fragments in the subsoil than the Oconaluftee, Guyot, and Cataloochee soils; in concave areas at the head of drains and in drainageways
- Chiltoskie soils that have loamy subsoils and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and in drainageways
- Random areas of soils on slopes of less than 50 percent or more than 95 percent

Similar inclusions:
- Oconaluftee soils that have fine sandy loam, sandy loam, and clay loam surface textures
- Guyot and Cataloochee soils that have fine sandy loam, sandy loam, and loam surface textures

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, bouldery surface, damaging high winds, short growing season, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, bouldery surface, damaging high winds, short growing season, and depth to bedrock. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, bouldery surface, damaging high winds, short growing season, and depth to bedrock. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of damaging high winds, short growing season, low productivity, and depth to bedrock. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, damaging high winds, prolonged freezing temperatures, and depth to bedrock. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the

slope, prolonged freezing temperatures, and depth to bedrock. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for roads and streets because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, damaging high winds, short growing season, and depth to bedrock. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: VIIe

PwC—Porters-Unaka complex, 8 to 15 percent slopes, stony

Setting

Landscape: Low and intermediate mountains, in the southwestern and eastern parts of the county
Elevation range: 3,000 to 4,800 feet
Landform: North- to east-facing ridges and those shaded by higher mountains
Landform position: Summits
Shape of areas: Long and narrow
Size of areas: As much as 15 acres

Composition

Porters soil and similar inclusions: 40 percent
Unaka soil and similar inclusions: 40 percent
Dissimilar inclusions: 20 percent

Typical Profile

Porters

Surface layer:
0 to 9 inches—dark brown loam

Subsoil:
9 to 54 inches—dark yellowish brown gravelly loam

Bedrock:
54 to 80 inches—unweathered, hard, biotite gneiss

Unaka

Surface layer:
0 to 9 inches—very dark brown loam

Subsoil:
9 to 27 inches—dark yellowish brown gravelly loam

Bedrock:
27 to 31 inches—weathered, biotite gneiss
31 to 80 inches—unweathered, hard, biotite gneiss

Soil Properties and Qualities

Depth class: Porters—deep; Unaka—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Porters—moderate; Unaka—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to cooler annual air temperatures, which allows for late spring and early fall frosts, and to higher soil moisture content due to north- to east-facing aspects or shading by higher mountains
Soil reaction: Porters—very strongly acid to slightly acid throughout the profile; Unaka—very strongly acid or strongly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Porters—40 to 60 inches to hard bedrock; Unaka—20 to 40 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts

Minor Components

Dissimilar inclusions:

- Random areas of soils that have bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil than the Porters and Unaka soils and have soft bedrock at a depth of 40 to more than 60 inches
- Tate soils that have more clay in the subsoil than the Porters and Unaka soils and have bedrock at a depth of more than 60 inches; in saddles and gaps
- Chestnut, Buladean, and Edneyville soils that have thinner surface layers with less organic matter and have soft bedrock at a depth of 20 to more than 60 inches; on shoulder slopes
- Random areas of soils on slopes of less than 8 percent or more than 15 percent
- Widely scattered areas of rock outcrop
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:

- Porters and Unaka soils that have sandy loam and fine sandy loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation, pasture, and building site development

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Porters—erodibility, equipment use, soil fertility, pesticide retention, and depth to bedrock; Unaka—erodibility, equipment use, soil fertility, pesticide retention, depth to bedrock, and droughtiness

- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit equipment use in the steeper areas.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Because of the low available water capacity and the moderately deep rooting depth, the Unaka soil is difficult to manage for cultivated crops.

Pasture and hayland

Suitability: Well suited
Management concerns: Porters—erodibility, equipment use, pesticide retention, soil fertility, and rooting depth; Unaka—erodibility, equipment use, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:

- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- The slope may limit equipment use in the steeper areas when harvesting hay crops.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Unaka soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Porters—suited; Unaka—poorly suited
Management concerns: Porters—erodibility, equipment use, pesticide retention, ball and burlap harvesting, climate, soil fertility, and rooting depth; Unaka—erodibility, equipment use, pesticide retention, ball and burlap harvesting, climate, soil fertility, rooting depth, and droughtiness
Management measures and considerations:

- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit equipment use in the steeper areas.
- These soils may retain soil-applied herbicides and other pesticides due to the high

content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Avoiding ball and burlap harvesting during dry periods helps to prevent fracture of the ball and separation of the soil from the roots caused by low moisture and minimal clay content.
- Due to the cooler air temperatures associated with the north- to east-facing aspects of this map unit, there is a potential that late spring frost will damage new growth in some years.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- In areas where water concentrates, ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity, windthrow hazard, and the moderately deep rooting depth, areas of the Unaka soil are difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and northern hardwoods
Suitability: Well suited
Management concerns: Porters—erodibility, equipment use, and pesticide retention; Unaka—erodibility, equipment use, pesticide retention, and windthrow hazard
Management measures and considerations:
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope and the high content of organic matter in the surface layer.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Blasting, shaping, and grading are needed if roads are to be constructed on the contour.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Unaka soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Depth to bedrock, slope, erodibility, and corrosivity
Management measures and considerations:
- Drilling and blasting of rock or special earthmoving equipment is needed to increase the depth of these soils.
- Designing structures so that they conform with natural slopes helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible or constructing silt fences helps to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to bedrock and slope
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Locating and using areas of the deeper Porters soil may improve the performance of filter fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Depth to bedrock, frost action, slope, and erodibility
Management measures and considerations:

- Blasting, shaping, and grading are needed if roads are to be constructed on the contour.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.

Lawns and landscaping

Suitability: Suited
Management concerns: Porters—slope, erodibility, pesticide retention, soil fertility, climate, and depth to bedrock; Unaka—slope, erodibility, pesticide retention, soil fertility, climate, depth to bedrock, and droughtiness
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation help to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- The use of native, winter-hardy landscape plants is recommended.
- Due to the cooler air temperatures associated with the north- to east-facing aspects of this map unit, there is a potential that late spring frost will damage new growth in some years.
- In areas where water concentrates, ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Unaka soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Group

Land capability classification: IIIe

PwD—Porters-Unaka complex, 15 to 30 percent slopes, stony

Setting

Landscape: Low and intermediate mountains, in the southwestern and eastern parts of the county
Elevation range: 3,000 to 4,800 feet
Landform: North- to east-facing ridges and those shaded by higher mountains
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow
Size of areas: As much as 107 acres

Composition

Porters soil and similar inclusions: 60 percent
Unaka soil and similar inclusions: 30 percent
Dissimilar inclusions: 10 percent

Typical Profile

Porters

Surface layer:
0 to 9 inches—dark brown loam

Subsoil:
9 to 54 inches—dark yellowish brown gravelly loam

Bedrock:
54 to 80 inches—unweathered, hard, biotite gneiss

Unaka

Surface layer:
0 to 9 inches—very dark brown loam

Subsoil:
9 to 27 inches—dark yellowish brown gravelly loam

Bedrock:
27 to 31 inches—weathered, biotite gneiss
31 to 80 inches—unweathered, hard, biotite gneiss

Soil Properties and Qualities

Depth class: Porters—deep; Unaka—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Porters—moderate; Unaka—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe

Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to cooler annual air temperatures, which allow late spring and early fall frosts, and to a higher soil moisture content due to north- to east-facing aspects or shading by higher mountains
Soil reaction: Porters—very strongly acid to slightly acid throughout the profile; Unaka—very strongly acid or strongly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Porters—40 to 60 inches to hard bedrock; Unaka—20 to 40 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts

Minor Components

Dissimilar inclusions:

- Random areas of soils that have bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil than the Porters and Unaka soils and have soft bedrock at a depth of 40 to more than 60 inches
- Tate and Tusquitee soils that have bedrock at a depth of more than 60 inches; in saddles and gaps and in concave areas at the head of drains
- Chestnut, Buladean, and Edneyville soils that have thinner surface layers with less organic matter and have soft bedrock at a depth of 20 to more than 60 inches; on south- to west-facing shoulder slopes, nose slopes, and side slopes
- Random areas of soils on slopes of less than 15 percent or more than 30 percent
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round
- Widely scattered areas of rock outcrop on narrow ridges

Similar inclusions:

- Porters and Unaka soils that have sandy loam and fine sandy loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation, pasture, and building site development

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Porters—equipment use, erodibility, soil fertility, pesticide retention, and depth to bedrock; Unaka—equipment use, erodibility, soil fertility, pesticide retention, depth to bedrock, and droughtiness
Management measures and considerations:

- These soils are difficult to manage for cultivated crops because the slope limits equipment use.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied

pesticides, which are tied up by the high content of clay, may increase their effectiveness.

- Because of the low available water capacity and the moderately deep rooting depth, the Unaka soil is difficult to manage for cultivated crops.

Pasture and hayland

Suitability: Suited
Management concerns: Porters—equipment use, erodibility, pesticide retention, soil fertility, and rooting depth; Unaka—equipment use, erodibility, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:

- The slope limits equipment use in the steeper areas.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Unaka soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Porters—suited; Unaka—poorly suited
Management concerns: Porters—equipment use, erodibility, pesticide retention, ball and burlap harvesting, plant shape, climate, soil fertility, and rooting depth; Unaka—equipment use, erodibility, pesticide retention, ball and burlap harvesting, plant shape, climate, soil fertility, rooting depth, and droughtiness
Management measures and considerations:

- These soils are difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Avoiding ball and burlap harvesting during dry periods helps to prevent fracture of the ball and separation of the soil from the roots caused by low moisture content and minimal clay content.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the cooler air temperatures associated with the north- to east-facing aspects of this map unit, there is a potential that late spring frost will damage new growth in some years.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

- Because of the low available water capacity, windthrow hazard, and the moderately deep rooting depth, areas of the Unaka soil are difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and northern hardwoods
Suitability: Suited
Management concerns: Porters—erodibility, equipment use, and pesticide retention; Unaka—erodibility, equipment use, pesticide retention, and windthrow hazard
Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope and the high content of organic matter in the surface layer.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Blasting, shaping, and grading is needed if roads are to be constructed on the contour.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Unaka soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, depth to bedrock, erodibility, and corrosivity
Management measures and considerations:

- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Drilling and blasting of rock or special earthmoving equipment is needed to increase the depth of these soils.
- Vegetating cleared and graded areas as soon as possible or constructing silt fences helps to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Porters soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, erodibility, depth to bedrock, and frost action
Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding

the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Blasting, shaping, and grading are needed if roads are to be constructed on the contour.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Porters—slope, erodibility, pesticide retention, soil fertility, climate, and depth to bedrock; Unaka—slope, erodibility, pesticide retention, soil fertility, climate, depth to bedrock, and droughtiness
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- The use of native, winter-hardy landscape plants is recommended.
- Due to the cooler air temperatures associated with the north- to east-facing aspects of this map unit, there is a potential that late spring frost will damage new growth in some years.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Unaka soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Group

Land capability classification: Porters—IVe; Unaka—VIe

PwE—Porters-Unaka complex, 30 to 50 percent slopes, stony

Setting

Landscape: Low and intermediate mountains, in the southwestern and eastern parts of the county
Elevation range: 3,000 to 4,800 feet
Landform: North- to east-facing ridges and mountain slopes and those shaded by higher mountains
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: As much as 198 acres

Composition

Porters soil and similar inclusions: 50 percent

Unaka soil and similar inclusions: 30 percent
Dissimilar inclusions: 20 percent

Typical Profile

Porters

Surface layer:
0 to 9 inches—dark brown loam

Subsoil:
9 to 54 inches—dark yellowish brown gravelly loam

Bedrock:
54 to 80 inches—unweathered, hard, biotite gneiss

Unaka

Surface layer:
0 to 9 inches—very dark brown loam

Subsoil:
9 to 27 inches—dark yellowish brown gravelly loam

Bedrock:
27 to 31 inches—weathered, biotite gneiss
31 to 80 inches—unweathered, hard, biotite gneiss

Soil Properties and Qualities

Depth class: Porters—deep; Unaka—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Porters—moderate; Unaka—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to cooler annual air temperatures, which allow late spring and early fall frosts, and a higher soil moisture content due to north- to east-facing aspects or shading by higher mountains
Soil reaction: Porters—very strongly acid to slightly acid throughout the profile; Unaka—very strongly acid or strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Porters—40 to 60 inches to hard bedrock; Unaka—20 to 40 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts in areas of the Unaka soil

Minor Components

Dissimilar inclusions:
- Random areas of soils that have bedrock at a depth of more than 60 inches
- Tate and Tusquitee soils that have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Chestnut, Buladean, and Edneyville soils that have thinner surface layers with less organic matter and have soft bedrock at a depth of 20 to more than 60 inches; on south- to west-facing spur ridges, nose slopes, and side slopes
- Widely scattered areas of rock outcrop
- Random areas of soils on slopes of less than 30 percent or more than 50 percent
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Porters and Unaka soils that have sandy loam and fine sandy loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation, pasture, and building site development

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management concerns: Porters—equipment use, erodibility, pesticide retention, soil fertility, and rooting depth; Unaka—equipment use, erodibility, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- Because of the slope, this map unit is difficult to manage for pasture or hayland.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Unaka soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Poorly suited

Management concerns: Porters—equipment use, erodibility, pesticide retention, ball and burlap harvesting, plant shape, climate, soil fertility, and rooting depth; Unaka—equipment use, erodibility, pesticide retention, ball and burlap harvesting, plant shape, climate, soil fertility, rooting depth, and droughtiness

Management measures and considerations:

- These soils are difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Avoiding ball and burlap harvesting during dry periods helps to prevent fracture of the ball and separation of the soil from the roots caused by low moisture and minimal clay content.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the cooler air temperatures associated with the north- to east-facing aspects of this map unit, there is a potential that late spring frost will damage new growth in some years.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity, windthrow hazard, and the moderately deep rooting depth, areas of the Unaka soil are difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and northern hardwoods

Suitability: Suited

Management concerns: Porters—equipment use, erodibility, and pesticide retention; Unaka—equipment use, erodibility, pesticide retention, and windthrow hazard

Management measures and considerations:

- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope and the high content of organic matter in the surface layer.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Blasting, shaping, and grading is needed if roads are to be constructed on the contour.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Unaka soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope, depth to bedrock, erodibility, and corrosivity
Management measures and considerations:

- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Drilling and blasting of rock or special earthmoving equipment is needed to increase the depth of these soils.
- Vegetating cleared and graded areas as soon as possible or constructing silt fences helps to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Depth to bedrock and slope
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Locating and using areas of the deeper Porters soil may improve the performance of filter fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, erodibility, depth to bedrock, frost action, and seeps and springs
Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, helps to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Blasting, shaping, and grading are needed if roads are to be constructed on the contour.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Porters—slope, erodibility, pesticide retention, soil fertility, climate, and depth to bedrock; Unaka—slope, erodibility, pesticide retention, soil fertility, climate, depth to bedrock, and droughtiness
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- The use of native, winter-hardy landscape plants is recommended.

- Due to the cooler air temperatures associated with the north- to east-facing aspects of this map unit, there is a potential that late spring frost will damage new growth in some years.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Unaka soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Group

Land capability classification: VIe

PxF—Porters-Unaka complex, 50 to 95 percent slopes, rocky

Setting

Landscape: Low and intermediate mountains, in the southwestern and eastern parts of the county
Elevation range: 3,000 to 4,800 feet
Landform: North- to east-facing mountain slopes and those shaded by higher mountains
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: As much as 324 acres

Composition

Porters soil and similar inclusions: 40 percent
Unaka soil and similar inclusions: 35 percent
Dissimilar inclusions: 25 percent

Typical Profile

Porters

Surface layer:
0 to 9 inches—dark brown loam

Subsoil:
9 to 54 inches—dark yellowish brown gravelly loam

Bedrock:
54 to 80 inches—unweathered, hard, biotite gneiss

Unaka

Surface layer:
0 to 9 inches—very dark brown loam

Subsoil:
9 to 27 inches—dark yellowish brown gravelly loam

Bedrock:
27 to 31 inches—weathered biotite gneiss
31 to 80 inches—unweathered, hard, biotite gneiss

Soil Properties and Qualities

Depth class: Porters—deep; Unaka—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Porters—moderate; Unaka—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Medium
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Extent of rock outcrop: About 2 percent on the soil surface
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to cooler annual air temperatures, which allow late spring and early fall frosts, and to higher soil moisture content due to north- to east-facing aspects or shading by higher mountains
Soil reaction: Porters—very strongly acid to slightly acid throughout the profile; Unaka—very strongly acid or strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic, high-grade metamorphic or igneous rock
Depth to bedrock: Porters—40 to 60 inches to hard bedrock; Unaka—20 to 40 inches to hard bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material; water movement along bedrock contacts in areas of the Unaka soil

Minor Components

Dissimilar inclusions:

- Random areas of soils that have bedrock at a depth of more than 60 inches
- Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Chestnut, Buladean, and Edneyville soils that have thinner surface layers with less organic matter and have soft bedrock at a depth of 20 to more than 60 inches; on south- to west-facing spur ridges, nose slopes, and side slopes
- Random areas of soils on slopes of less than 50 percent or more than 95 percent
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:

- Porters and Unaka soils that have sandy loam and fine sandy loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and northern hardwoods
Suitability: Poorly suited
Management concerns: Porters—equipment use, erodibility, and pesticide retention; Unaka—equipment use, erodibility, pesticide retention, and windthrow hazard
Management measures and considerations:
- Using cable logging methods helps to overcome equipment limitations and prevents the acceleration of erosion caused by road construction, skid trails, and disturbance of the forest floor by heavy machinery.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Unaka soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope, depth to bedrock, and the extent of rock outcrops. Contact the local Health Department for additional guidance.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: VIIe

RbA—Reddies sandy loam, 0 to 3 percent slopes, occasionally flooded

Setting

Landscape: Mountain valleys in low and intermediate mountains throughout the county
Elevation range: 1,300 to 2,050 feet
Landform: Flood plains dominantly at the upper end of mountain valleys
Landform position: Planar to slightly convex bottomland slopes
Shape of areas: Long and narrow
Size of areas: As much as 31 acres

Composition

Reddies soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 14 inches—very dark grayish brown sandy loam

Subsoil:
14 to 26 inches—dark yellowish brown fine sandy loam

Underlying material:
26 to 80 inches—multicolored very gravelly sand

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Moderately well drained
General texture class: Loamy in the upper part and sandy or sandy-skeletal in the lower part
Permeability: Moderately rapid in the surface layer and subsoil and rapid or very rapid in the underlying material
Available water capacity: Very low
Depth to seasonal high water table: 2.0 to 3.5 feet from December through May and 2.5 to 4.0 feet from June through November

Hazard of flooding: Occasional; throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Nearly level or gently sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: None or slight
Organic matter content of surface layer: High
Potential frost action: Moderate
Special climatic conditions: Soils subject to slow air drainage, which allows late spring and early fall frosts
Soil reaction: Very strongly acid to neutral throughout the profile
Parent material: Alluvium derived from felsic or mafic, high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Depth to contrasting material: 20 to 40 inches to deposits of cobbles and gravel that are stratified with sandy or loamy material
Other distinctive properties: Soil subject to scouring and deposition during flooding

Minor Components

Dissimilar inclusions:

- Soils that have a rare flooding hazard; on wider flood plains
- Soils that are well drained to excessively well drained; in wider units and in those adjacent to deeper stream channels
- Somewhat poorly drained French and poorly drained Ela soils that have subsoils that are loamy in the upper part and have strata with a high content of rock fragments at a depth of 20 to 40 inches; in depressions, old stream channels, and backwater areas
- Dellwood soils that have deposits of cobbles and gravel at a depth of 8 to 20 inches and are stratified with sandy or loamy material
- Well drained Rosman soils that have strata with a high content of rock fragments at a depth of more than 40 inches; in slightly higher-lying positions
- Moderately well drained Dillard soils that have more clay and fewer rock fragments in the subsoil than the Reddies soil; on low stream terraces and toeslopes
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways
- Random areas of soils on slopes of more than 3 percent

Similar inclusions:

- Reddies soils that have fine sandy loam and loam surface textures

Land Use

Dominant Uses: Cropland and ornamental crops
Other Uses: Pasture, hayland, recreation, and wildlife habitat

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Flooding, droughtiness, pesticide retention, soil fertility, nutrient leaching, and climate
Management measures and considerations:

- Although most flooding occurs during the winter months, there is a risk of crop loss during the growing season.

- This soil has a low available water capacity and becomes droughty during periods of low rainfall.
- Conservation tillage, winter cover crops, crop residue management, and crop rotations that include grasses and legumes help to increase the available water capacity band improve soil fertility.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to prevent the leaching of plant nutrients below the rooting zone and into the water table.
- Using frequent and light applications of irrigation water helps to prevent the leaching of plant nutrients below the rooting zone.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Pasture and hayland

Suitability: Well suited
Management concerns: Flooding, droughtiness, pesticide retention, soil fertility, nutrient leaching, and erodibility
Management measures and considerations:

- Although most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- This soil has a low available water capacity and becomes droughty during periods of low rainfall.
- Using supplemental irrigation and crop varieties adapted to droughty conditions helps to increase crop production.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to prevent the leaching of plant nutrients below the rooting zone and into the water table.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.

Orchard and ornamental crops

Suitability: Orchards—unsuited; ornamental crops—poorly suited
Management concerns: Flooding, droughtiness, root disease, climate, soil fertility, nutrient leaching, pesticide retention, and ball and burlap harvesting
Management measures and considerations:

- Because of the potential for flooding, this soil is difficult to manage for orchard or ornamental crops.

- This soil has a low available water capacity and becomes droughty during periods of low rainfall.
- Due to the seasonal high water table and flooding, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as toeslopes and drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to prevent the leaching of plant nutrients below the rooting zone and into the water table.
- Using frequent and light applications of irrigation water helps to prevent the leaching of plant nutrients below the rooting zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Avoiding ball and burlap harvesting during dry periods helps to prevent fracture of the ball and separation of the soil from the roots caused by low moisture and minimal clay content.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods
Suitability: Well suited
Management concerns: Flooding and pesticide retention
Management measures and considerations:

- The potential for flooding should be a consideration in the placement of haul roads and log landings.
- Soil-applied herbicides are retained due to herbicide-organic matter bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for dwellings because of the flooding and wetness. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for septic tank absorption fields because of the wetness and poor filtering capacity. Contact the local Health Department for additional guidance.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for roads and streets because of flooding. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Suited
Management concerns: Flooding, droughtiness, pesticide retention, soil fertility, nutrient leaching, root disease, and climate
Management measures and considerations:

- Because of the flooding, this soil is difficult to manage and use is severely limited during periods of inundation.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants. Split applications help to increase the effectiveness of lime and fertilizer.
- Using frequent and light applications of irrigation water helps to prevent the leaching of plant nutrients below the rooting zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Due to the seasonal high water table and flooding, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as toeslopes and drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Interpretive Group

Land capability classification: IIw

RcF—Rock outcrop-Cataska complex, 30 to 95 percent slopes, very stony

Setting

Landscape: Low and intermediate mountains, dominantly along Spring and Little Laurel Creeks and the French Broad River gorge in the north-central part of the county
Elevation range: 1,300 to 4,000 feet
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: As much as 33 acres

Composition

Rock outcrop: 55 percent
Cataska soil and similar inclusions: 30 percent
Dissimilar inclusions: 15 percent

Typical Profile

Rock outcrop

This part of the map unit consists of outcrops of predominantly slate and phyllite bedrock.

Cataska

Surface layer:
0 to 6 inches—yellowish brown very channery loam

Subsoil:
6 to 16 inches—light yellowish brown very channery silt loam

Bedrock:
16 to 28 inches—weathered slate
28 to 80 inches—unweathered, hard slate

Properties and Qualities of the Cataska Soil

Depth class: Shallow
Drainage class: Excessively drained
General texture class: Loamy with many rock fragments
Permeability: Moderately rapid or rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep or very steep
Soil slippage potential: High
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: 10 to 20 inches to soft bedrock
Other distinctive properties: Soil subject to downslope movement when lateral support is removed and to differential settling when used as fill material; a high content of rock fragments

Minor Components

Dissimilar inclusions:
- Maymead soils that have bedrock at a depth of more than 60 inches; on toeslopes, on benches, and in saddles and gaps
- Northcove soils that have more rock fragments in the subsoil than the Cataska soil; in drainageways and below rock outcrops
- Random areas of soils that have bedrock at a depth of more than 20 inches
- Soils that have hard bedrock at a depth of 7 to 10 inches; adjacent to rock outcrops
- Random areas of soils on slopes of less than 50 percent or more than 95 percent
- Random areas where landslides have occurred
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Cataska soils that have fine sandy loam surface textures

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for pasture and hay production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: Rock outcrop—VIIIs; Cataska—VIIs

RhD—Rock outcrop-Chestoa complex, 8 to 30 percent slopes, very bouldery

Setting

Landscape: Intermediate mountains along the Tennessee State line, from Baxter Branch to Bear Creek in the northern part of the county
Elevation range: 3,600 to 4,300 feet
Landform: North- to east-facing ridges and those shaded by the higher mountains
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow
Size of areas: As much as 22 acres

Composition

Rock outcrop: 60 percent
Chestoa soil and similar inclusions: 30 percent
Dissimilar inclusions: 10 percent

Typical Profile

Rock outcrop

This part of the map unit consists of outcrops of predominantly arkosic metasandstone and quartzite bedrock.

Chestoa

Surface layer:
0 to 13 inches—very dark brown sandy loam

Subsoil:
13 to 26 inches—grayish brown channery sandy loam

Bedrock:
26 to 80 inches—unweathered, hard quartzite

Properties and Qualities of the Chestoa Soil

Depth class: Moderately deep
Drainage class: Somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping to moderately steep

Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soil subject to cooler annual air temperatures, which allow late spring and early fall frosts, and to a higher soil moisture content due to north- to east-facing aspects or shading by higher mountains
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: 20 to 40 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts; low natural fertility

Minor Components

Dissimilar inclusions:

- Maymead soils that have bedrock at a depth of more than 60 inches; in saddles and gaps
- Soils that have hard bedrock at a depth of 1 to 20 inches; adjacent to rock outcrops
- Random areas of soils that have bedrock at a depth of more than 20 inches
- Random areas of soils on slopes of less than 8 percent or more than 30 percent
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:

- Chestoa soils that have fine sandy loam and loam surface textures

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for pasture and hay production because of erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for orchard and ornamental crops because of erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for timber production because of erodibility, low productivity, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for dwellings because of erodibility, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for septic tank absorption fields because of depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for roads and streets because of erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: Rock outcrop—VIIIs; Chestoa—VIIe

RhF—Rock outcrop-Chestoa complex, 30 to 95 percent slopes, very bouldery

Setting

Landscape: Intermediate mountains along the Tennessee State line, from Baxter Branch to Bear Creek in the northern part of the county
Elevation range: 3,600 to 4,300 feet

Landform: Ridges and north- to east-facing mountain slopes and those shaded by higher mountains
Landform position: Summits and side slopes
Shape of areas: Irregular
Size of areas: As much as 45 acres

Composition

Rock outcrop: 65 percent
Chestoa soil and similar inclusions: 25 percent
Dissimilar inclusions: 10 percent

Typical Profile

Rock outcrop

This part of the map unit consists of outcrops of predominantly arkosic metasandstone and quartzite bedrock.

Chestoa

Surface layer:
0 to 13 inches—very dark brown sandy loam

Subsoil:
13 to 26 inches—grayish brown channery sandy loam

Bedrock:
26 to 80 inches—unweathered, hard quartzite

Soil Properties and Qualities

Depth class: Moderately deep
Drainage class: Somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep or very steep
Soil slippage potential: High
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soil subject to cooler annual air temperatures, which allow late spring and early fall frosts, and to a higher soil moisture content due to north- to east-facing aspects or shading by higher mountains
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: 20 to 40 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts; soil subject to downslope movement when lateral support is removed and to differential settling when used as fill material; low natural fertility

Minor Components

Dissimilar inclusions:
- Random areas of soils that have bedrock at a depth of more than 20 inches
- Northcove soils that have more rock fragments in the subsoil than the Chestoa soil and have bedrock at a depth of more than 60 inches; on footslopes, in drainageways, and below rock outcrops
- Maymead soils that have bedrock at a depth of more than 60 inches; on toeslopes, on benches, and in saddles and gaps
- Soils that have hard bedrock at a depth of 1 to 20 inches; adjacent to rock outcrops
- Random areas of soils on slopes of less than 30 percent or more than 95 percent
- Random areas where landslides have occurred
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Chestoa soils that have fine sandy loam and loam surface textures

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for pasture and hay production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited

Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: Rock outcrop—VIIIs; Chestoa—VIIe

RkF—Rock outcrop-Cleveland complex, 30 to 95 percent slopes, very bouldery

Setting

Landscape: Low and intermediate mountains; dominantly in the southwestern part of the county
Elevation range: 1,800 to 4,500 feet
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: As much as 49 acres

Composition

Rock outcrop: 60 percent
Cleveland soil and similar inclusions: 30 percent
Dissimilar inclusions: 10 percent

Typical Profile

Rock outcrop

This part of the map unit consists of outcrops of predominantly granite and biotite gneiss bedrock.

Cleveland

Surface layer:
0 to 5 inches—dark brown sandy loam

Subsoil:
5 to 14 inches—dark yellowish brown sandy loam

Bedrock:
14 to 80 inches—unweathered, hard biotite gneiss

Properties and Qualities of the Cleveland Soil

Depth class: Shallow
Drainage class: Somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep or very steep
Soil slippage potential: High
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic, high-grade metamorphic or igneous rock
Depth to bedrock: 10 to 20 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts; soil subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Areas of soils that have hard bedrock at a depth of 1 to 10 inches; adjacent to rock outcrops
- Random areas of soils that have bedrock at a depth of more than 20 inches
- Random areas of soils on slopes of less than 30 percent or more than 95 percent
- Random areas where landslides have occurred
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Cleveland soils that have fine sandy loam surface textures

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for pasture and hay production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope,

erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: Rock outcrop—VIIIs; Cleveland—VIIs

RoF—Rock outcrop-Oteen complex, 30 to 95 percent slopes, very bouldery

Setting

Landscape: Low and intermediate mountains, dominantly along the French Broad River gorge in the south-central part of the county
Elevation range: 1,600 to 3,500 feet
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: As much as 722 acres

Composition

Rock outcrop: 60 percent
Oteen soil and similar inclusions: 30 percent
Dissimilar inclusions: 10 percent

Typical Profile

Rock outcrop

This part of the map unit consists of outcrops of predominantly migmatitic gneiss bedrock.

Oteen

Surface layer:
0 to 2 inches—dark brown fine sandy loam

Subsoil:
2 to 11 inches—dark yellowish brown fine sandy loam

Underlying material:
11 to 15 inches—dark yellowish brown very gravelly sandy loam saprolite

Bedrock:
15 to 80 inches—weathered, migmatitic gneiss bedrock

Soil Properties and Qualities

Depth class: Shallow
Drainage class: Somewhat excessively drained

General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep or very steep
Soil slippage potential: High
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Very strongly acid to neutral throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic, high-grade metamorphic or igneous rock
Depth to bedrock: 10 to 20 inches to soft bedrock
Other distinctive properties: Soil subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:

- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; on toeslopes, on benches, and in saddles and gaps
- Soils that have hard bedrock at a depth of 1 to 10 inches; adjacent to rock outcrops
- Random areas of soils that have bedrock at a depth of more than 20 inches
- Random areas of soils on slopes of less than 30 percent or more than 95 percent
- Random areas where landslides have occurred

Similar inclusions:

- Oteen soils that have sandy loam or loam surface textures

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for pasture and hay production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: Rock outcrop—VIIIs; Oteen—VIIe

RpF—Rock outcrop-Unicoi complex, 30 to 95 percent slopes, very bouldery

Setting

Landscape: Low and intermediate mountains; dominantly in the northwestern and northeastern parts of the county
Elevation range: 1,400 to 3,950 feet
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: As much as 70 acres

Composition

Rock outcrop: 45 percent
Unicoi soil and similar inclusions: 40 percent
Dissimilar inclusions: 15 percent

Typical Profile

Rock outcrop

This part of the map unit consists of outcrops of predominantly arkosic metasandstone bedrock.

Unicoi

Surface layer:
0 to 5 inches—dark grayish brown cobbly sandy loam

Subsoil:
5 to 16 inches—dark yellowish brown very cobbly sandy loam

Bedrock:
16 to 80 inches—unweathered, hard, arkosic metasandstone and quartzite

Properties and Qualities of the Unicoi Soil

Depth class: Shallow
Drainage class: Somewhat excessively drained
General texture class: Loamy with many rock fragments
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep or very steep
Soil slippage potential: High
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock

Depth to bedrock: 10 to 20 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts; soil subject to downslope movement when lateral support is removed and to differential settling when used as fill material; low natural fertility

Minor Components

Dissimilar inclusions:
- Maymead soils that have bedrock at a depth of more than 60 inches; on toeslopes, on benches, and in saddles and gaps
- Northcove soils that have more rock fragments in the subsoil than the Unicoi soil; in drainageways and below rock outcrops
- Soils that have hard bedrock at a depth of 1 to 7 inches; adjacent to rock outcrops
- Random areas of soils that have bedrock at a depth of more than 20 inches
- Random areas of soils on slopes of less than 30 percent or more than 95 percent
- Random areas where landslides have occurred

Similar inclusions:
- Unicoi soils that have fine sandy loam surface textures

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for pasture and hay production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: Rock outcrop—VIIIs; Unicoi—VIIs

RsA—Rosman fine sandy loam, 0 to 3 percent slopes, occasionally flooded

Setting

Landscape: Mountain valleys, dominantly along Ivy, Shelton Laurel, and Spring Creeks and the French Broad River
Elevation range: 1,250 to 1,800 feet
Landform: Flood plains
Landform position: Planar to slightly convex bottomland slopes
Shape of areas: Long and narrow or irregular on wider flood plains
Size of areas: As much as 29 acres

Composition

Rosman soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 10 inches—very dark brown fine sandy loam

Subsoil:
10 to 59 inches—yellowish brown fine sandy loam

Underlying material:
59 to 80 inches—dark yellowish brown and grayish brown fine sandy loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: 3.5 to more than 6.0 feet from Jannuary through December
Hazard of flooding: Occasional; throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Nearly level or gently sloping
Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: None or slight
Organic matter content of surface layer: High
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, which allows late spring and early fall frosts
Soil reaction: Strongly acid to neutral throughout the profile
Parent material: Alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Depth to contrasting material: More than 40 inches to deposits of cobbles and gravel that are stratified with sandy or loamy material
Other distinctive properties: Soil subject to scouring and deposition during flooding

Minor Components

Dissimilar inclusions:
- Soils that have a rare flooding hazard; on wider flood plains
- Somewhat poorly drained French and poorly drained Ela soils that have subsoils that are loamy in the upper part and that have strata with a high content of rock fragments at a depth of 20 to 40 inches; along stream channels
- Well drained Biltmore soils that have sandy subsoils; on streambanks and along sharp river bends
- Somewhat poorly drained soils that have loamy subsoils; in depressions, old stream channels, and backwater areas
- Moderately well drained Dellwood and Reddies soils that are loamy in the upper part and have strata with a high content of rock fragments at a depth of 8 to 40 inches; along stream channels
- Moderately well drained Dillard soils that have more clay in the subsoil than the Rosman soil; on low stream terraces and toeslopes
- Well drained Tate and Statler soils that have more clay in the subsoil than the Rosman soil; on toeslopes and low terraces
- Poorly drained Hemphill soils that have clayey subsoils; in depressions and backwater areas

Similar inclusions:
- Rosman soils that have sandy loam, loam, and silt loam surface textures

Land Use

Dominant Uses: Cropland and ornamental crops
Other Uses: Pasture, hayland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Flooding, droughtiness, soil fertility, nutrient leaching, pesticide retention, and climate
Management measures and considerations:
- Although most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- This soil has a low available water capacity and becomes droughty during periods of low rainfall.
- Conservation tillage, winter cover crops, crop residue management, and crop rotations that include grasses and legumes help to increase the available water capacity and improve soil fertility.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity. Split applications help to increase the effectiveness of lime and fertilizer.
- Frequent and light applications of irrigation water help to prevent the leaching of plant nutrients below the rooting zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Pasture and hayland

Suitability: Well suited
Management concerns: Flooding, droughtiness, pesticide retention, soil fertility, nutrient leaching, and erodibility
Management measures and considerations:
- Although most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- This soil has a low available water capacity and becomes droughty during periods of low rainfall.
- Using supplemental irrigation and crop varieties adapted to droughty conditions helps to increase crop production.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using split applications of fertilizer helps to increase its effectiveness.
- Using rotational grazing, implementing a well planned harvesting schedule, and

removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.

Orchard and ornamental crops

Suitability: Orchards—unsuited; ornamental crops—suited
Management concerns: Flooding, droughtiness, climate, soil fertility, nutrient leaching, pesticide retention, and ball and burlap harvesting
Management measures and considerations:
- Because of the potential for flooding, this soil can be difficult to manage for ornamental crops.
- This soil has a low available water capacity and becomes droughty during periods of low rainfall.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity. Split applications help to increase the effectiveness of lime and fertilizer.
- Frequent and light applications of irrigation water help to prevent the leaching of plant nutrients below the rooting zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Avoiding ball and burlap harvesting during dry periods helps to prevent fracture of the ball and separation of the soil from the roots caused by low moisture and minimal clay content.
- Due to flooding, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as toeslopes and drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Woodland Management and Productivity

Potential for commercial species: Moderately high for yellow-poplar and very high for eastern white pine
Suitability: Well suited
Management concerns: Flooding, seedling survival, and pesticide retention
Management measures and considerations:
- The potential for flooding should be a consideration in the placement of haul roads and log landings.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the flooding and the potential for a seasonal high water table. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited

Management measures and considerations:

- This map unit is severely limited for septic tank absorption fields because of flooding and the potential for a seasonal high water table. Contact the local Health Department for additional guidance.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for roads and streets because of flooding. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Suited
Management concerns: Flooding, droughtiness, pesticide retention, soil fertility, nutrient leaching, and climate
Management measures and considerations:

- Because of the flooding, this soil is difficult to manage and may be severely limited during periods of inundation.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants. Split applications of lime and fertilizer help to increase their effectiveness.
- Frequent and light applications of irrigation water help to prevent the leaching of plant nutrients below the rooting zone.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Due to the flooding, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as toeslopes and drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: IIw

SoD—Soco-Stecoah complex, 15 to 30 percent slopes, stony

Setting

Landscape: Low and intermediate mountains; dominantly in the northwestern and northern parts of the county
Elevation range: 1,400 to 4,250 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow
Size of areas: As much as 147 acres

Composition

Soco soil and similar inclusions: 50 percent

Stecoah soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Soco

Surface layer:
0 to 2 inches—very dark grayish brown fine sandy loam

Subsoil:
2 to 33 inches—yellowish brown fine sandy loam

Bedrock:
33 to 80 inches—weathered metasandstone

Stecoah

Surface layer:
0 to 2 inches—very dark grayish brown fine sandy loam

Subsoil:
2 to 47 inches—light yellowish brown sandy loam

Bedrock:
47 to 80 inches—weathered metasandstone

Soil Properties and Qualities

Depth class: Soco—moderately deep; Stecoah—deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum weathered from low-grade metasedimentary rock
Depth to bedrock: Soco—20 to 40 inches to soft bedrock; Stecoah—40 to 60 inches to soft bedrock

Minor Components

Dissimilar inclusions:

- Maymead soils that have bedrock at a depth of more than 60 inches; in saddles and gaps and in concave areas at the head of drains
- Random areas of Junaluska and Brasstown soils that have more clay in the subsoil than the Soco and Stecoah soils and have soft bedrock at a depth of 20 to 60 inches
- Random areas of soils on slopes of less than 15 percent or more than 30 percent
- Widely scattered areas of rock outcrop

- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Soco and Stecoah soils that have fine sandy loam, loam, and silt loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture, hayland, building site development, and recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Suited
Management concerns: Soco—equipment use, erodibility, soil fertility, rooting depth, and droughtiness; Stecoah—equipment use, erodibility, soil fertility, and rooting depth
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Soco soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Soco—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness; Stecoah—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, and rooting depth
Management measures and considerations:
- These soils are difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent fracture of the ball and separation of the soil from the roots caused by low moisture and minimal clay content.
- The slope affects the shape of ornamentals on the uphill side.
- In areas where water concentrates, such as drainageways, Fraser fir and other

ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity, windthrow hazard, and the moderately deep rooting depth, areas of the Soco soil are difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Low for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Soco—equipment use, erodibility, and windthrow hazard; Stecoah—equipment use and erodibility
Management measures and considerations:
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited because of the limited rooting depth of the Soco soil.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Stecoah soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited

Management concerns: Slope, low strength, erodibility, depth to bedrock, and frost action

Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.
- The soft bedrock underlying the soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited

Management concerns: Soco—slope, erodibility, soil fertility, depth to bedrock, and droughtiness; Stecoah—slope, erodibility, soil fertility, and depth to bedrock

Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- The use of native landscape plants that are tolerant of droughty, acidic soils is recommended.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Soco soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock needs to be removed.

Interpretive Group

Land capability classification: IVe

SoE—Soco-Stecoah complex, 30 to 50 percent slopes, stony

Setting

Landscape: Low and intermediate mountains; dominantly in the northwestern and northern parts of the county

Elevation range: 1,400 to 4,250 feet

Landform: Ridges and south- to west-facing mountain slopes

Landform position: Summits and side slopes

Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: As much as 161 acres

Composition

Soco soil and similar inclusions: 45 percent
Stecoah soil and similar inclusions: 35 percent
Dissimilar inclusions: 20 percent

Typical Profile

Soco

Surface layer:
0 to 2 inches—very dark grayish brown fine sandy loam

Subsoil:
2 to 33 inches—yellowish brown fine sandy loam

Bedrock:
33 to 80 inches—weathered metasandstone

Stecoah

Surface layer:
0 to 2 inches—very dark grayish brown fine sandy loam

Subsoil:
2 to 47 inches—light yellowish brown sandy loam

Bedrock:
47 to 80 inches—weathered metasandstone

Soil Properties and Qualities

Depth class: Soco—moderately deep; Stecoah—deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: Soco—20 to 40 inches to soft bedrock; Stecoah—40 to 60 inches to soft bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Maymead soils that have bedrock at a depth of more than 60 inches; on benches, on footslopes, and in concave areas at the head of drains
- Northcove soils that have more rock fragments in the subsoil than the Soco and Stecoah soils and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Cheoah and Jeffrey soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Random areas of Junaluska and Brasstown soils that have more clay in the subsoil than the Soco and Stecoah soils and have soft bedrock at a depth of 20 to 60 inches
- Widely scattered areas of rock outcrop
- Random areas of soils on slopes of less than 30 percent or more than 50 percent

Similar inclusions:
- Soco and Stecoah soils that have fine sandy loam, loam, and silt loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture, building site development, and recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management concerns: Soco—equipment use, erodibility, soil fertility, rooting depth, and droughtiness; Stecoah—equipment use, erodibility, soil fertility, and rooting depth
Management measures and considerations:
- Because of the slope, this map unit is difficult to manage for pasture or hayland.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Soco soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Soco—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness; Stecoah—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, and rooting depth

Management measures and considerations:
- These soils are difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent fracture of the ball and separation of the soil from the roots caused by low moisture and minimal clay content.
- The slope affects the shape of ornamentals on the uphill side.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity, windthrow hazard, and moderately deep rooting depth, areas of the Soco soil are difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Low for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Soco—equipment use, erodibility, and windthrow hazard; Stecoah—equipment use and erodibility
Management measures and considerations:
- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited because of the limited rooting depth of the Soco soil.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.

- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Stecoah soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, erodibility, slippage, differential settling, depth to bedrock, low strength, and frost action
Management measures and considerations:

- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, helps to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- The soft bedrock underlying the soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.
- These soils are subject to uneven settling and may be unstable if not properly compacted.
- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Soco—slope, erodibility, droughtiness, soil fertility, and depth to bedrock; Stecoah—slope, erodibility, droughtiness, and soil fertility
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- The use of native landscape plants that are tolerant of droughty, acidic soils is recommended.
- In areas where water concentrates, such as drainageways, Fraser fir and other

ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

- Because of the moderately deep rooting depth, the Soco soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock needs to be removed.

Interpretive Group

Land capability classification: VIe

SoF—Soco-Stecoah complex, 50 to 95 percent slopes, stony

Setting

Landscape: Low and intermediate mountains; dominantly in the northwestern and northern parts of the county
Elevation range: 1,400 to 4,250 feet
Landform: South- to west-facing mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: As much as 398 acres

Composition

Soco soil and similar inclusions: 45 percent
Stecoah soil and similar inclusions: 35 percent
Dissimilar inclusions: 20 percent

Typical Profile

Soco

Surface layer:
0 to 2 inches—very dark grayish brown fine sandy loam

Subsoil:
2 to 33 inches—yellowish brown fine sandy loam

Bedrock:
33 to 80 inches—weathered metasandstone

Stecoah

Surface layer:
0 to 2 inches—very dark grayish brown fine sandy loam

Subsoil:
2 to 47 inches—light yellowish brown sandy loam

Bedrock:
47 to 80 inches—weathered metasandstone

Soil Properties and Qualities

Depth class: Soco—moderately deep; Stecoah—deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low

Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Medium
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: Soco—20 to 40 inches to soft bedrock; Stecoah—40 to 60 inches to soft bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Maymead soils that have bedrock at a depth of more than 60 inches; on benches, on footslopes, and in concave areas at the head of drains
- Northcove soils that have more rock fragments in the subsoil than the Soco and Stecoah soils; in drainageways and below rock outcrops
- Cheoah and Jeffrey soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Ditney soils that have less clay in the subsoil than the Soco and Stecoah soils and have hard bedrock at a depth of 20 to 40 inches; on spur ridges
- Sylco soils that have more rock fragments in the subsoil than the Soco and Stecoah soils and have hard bedrock at a depth of 20 to 40 inches; adjacent to rock outcrops
- Widely scattered areas of rock outcrop
- Random areas of soils on slopes of less than 50 percent or more than 95 percent
- Random areas where landslides have occurred

Similar inclusions:
- Soco and Stecoah soils that have fine sandy loam, loam, and silt loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for the production of pasture and hay crops

because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Low for hardwoods and high for eastern white pine
Suitability: Poorly suited
Management concerns: Soco—equipment use, erodibility, and windthrow hazard; Stecoah—equipment use and erodibility
Management measures and considerations:
- Using cable logging methods helps to overcome equipment limitations and prevents the acceleration of erosion caused by road construction, skid trails, and disturbance of the forest floor by heavy machinery.
- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited because of the limited rooting depth of the Soco soil.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope and depth to bedrock. Contact the local Health Department for additional guidance.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited

Management measures and considerations:

- This map unit is severely limited for lawns and landscaping because of the slope and depth to bedrock. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: VIIe

StB—Statler loam, 1 to 5 percent slopes, rarely flooded

Setting

Landscape: Mountain valleys of low mountains, dominantly along Shelton Laurel and Spring Creeks in the northwestern parts of the county and in the intermountain hills in the southeastern parts of the county
Elevation range: 1,250 to 2,250 feet
Landform: Low stream terraces
Landform position: Concave to planar toeslopes
Shape of areas: Long and narrow
Size of areas: As much as 46 acres

Composition

Statler soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 10 inches—dark brown fine sandy loam

Subsoil:
10 to 50 inches—brownish yellow clay loam

Underlying material:
50 to 80 inches—multicolored sandy clay loam that has mottles in shades of red, brown, and gray

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Moderate or high
Depth to seasonal high water table: 4.0 to 6.0 feet from January through December
Hazard of flooding: Rare; throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Moderate
Organic matter content of surface layer: High
Potential frost action: Moderate
Soil reaction: Strongly acid to moderately acid in the A horizon, except where limed, and very strongly acid to moderately acid in the B and C horizons
Parent material: Old alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock

Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Well drained Tate soils on toeslopes
- Soils that have surface layers with less organic matter than those of the Statler soil; in cropped fields
- Somewhat poorly drained French soils that have subsoils that are loamy in the upper part and have strata with a high content of rock fragments at a depth of 20 to 40 inches; along stream channels
- Poorly drained soils that have loamy to clayey subsoils in backwater areas
- Somewhat poorly drained soils that have loamy subsoils in backwater areas
- Well drained Rosman soils that have loamy subsoils along stream channels
- Moderately well drained Dellwood and Reddies soils that are loamy in the upper part and have strata with a high content of rock fragments at a depth of 8 to 40 inches; along stream channels
- Moderately well drained Dillard soils on low terraces
- Random areas of soils on slopes of more than 5 percent

Similar inclusions:
- Statler soils that have sandy loam, fine sandy loam, and sandy clay loam surface textures

Land Use

Dominant Uses: Cropland
Other Uses: Pasture and hayland

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Erodibility, climate, tilth, and soil fertility
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility and soil fertility
Management measures and considerations:
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.

- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Suited
Management concerns: Erodibility, wetness, climate, root disease, and soil fertility
Management measures and considerations:

- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and very high for eastern white pine
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to slope, the high content of organic matter in the surface layer, and the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Flooding, wetness, erodibility, and corrosivity
Management measures and considerations:

- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for dwellings.

- This map unit may be difficult to manage for dwellings due to a seasonal high water table at a depth of 4.0 to 6.0 feet.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Wetness, seeps and springs, and restricted permeability
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.

Local roads and streets

Suitability: Poorly suited
Management concerns: Low soil strength, seeps and springs, erodibility, and flooding
Management measures and considerations:
- When the soil is wet, unsurfaced roads are highly erodible and very slick due the content of silt and clay in the subsoil.
- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.

Lawns and landscaping

Suitability: Suited
Management concerns: Erodibility, wetness, flooding, root disease, soil fertility, soil compaction, and climate
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating disturbed areas and using erosion-control structures such as sediment fences help to keep eroding soil onsite.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Interpretive Group

Land capability classification: IIe

SwD—Sylco-Cataska complex, 15 to 30 percent slopes, very rocky

Setting

Landscape: Low and intermediate mountains in the northwestern and north-central parts of the county
Elevation range: 1,400 to 4,250 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow
Size of areas: As much as 75 acres

Composition

Sylco soil and similar inclusions: 60 percent
Cataska soil and similar inclusions: 30 percent
Dissimilar inclusions: 10 percent

Typical Profile

Sylco

Surface layer:
0 to 6 inches—dark yellowish brown very channery loam

Subsoil:
6 to 22 inches—brown very channery silt loam
22 to 30 inches—strong brown very channery silt loam

Bedrock:
30 to 80 inches—unweathered, hard, interbedded slate and phyllite

Cataska

Surface layer:
0 to 6 inches—yellowish brown channery loam

Subsoil:
6 to 16 inches—light yellowish brown very channery silt loam

Bedrock:
16 to 28 inches—weathered slate
28 to 80 inches—unweathered, hard slate

Soil Properties and Qualities

Depth class: Sylco—moderately deep; Cataska—shallow
Drainage class: Sylco—somewhat excessively drained; Cataska—excessively drained
General texture class: Loamy with many rock fragments
Permeability: Sylco—moderately rapid; Cataska—moderately rapid or rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe

Rock fragments on the surface: Widely scattered surface stones and cobbles that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Extent of rock outcrop: About 10 percent on the soil surface
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum weathered from low-grade metasedimentary rock
Depth to bedrock: Sylco—20 to 40 inches to hard bedrock; Cataska—10 to 20 inches to soft bedrock
Other distinctive properties: A high content of rock fragments; water movement along bedrock contacts in the Sylco soil

Minor Components

Dissimilar inclusions:
- Random areas of Soco and Stecoah soils that have soft bedrock at a depth of 20 to 60 inches
- Areas of soils that have hard bedrock at a depth of less than 10 inches; adjacent to rock outcrops
- Maymead soils that have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and in saddles and gaps
- Random areas of soils on slopes of less than 15 percent or more than 30 percent

Similar inclusions:
- Sylco soils that have silt loam surface textures
- Cataska soils that have fine sandy loam, loam, and silt loam surface textures

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management concerns: Equipment use, erodibility, rooting depth, droughtiness, and soil fertility
Management measures and considerations:
- This map unit is difficult to manage for pasture and hay production because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned clipping and harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Unsuited

Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Depth to bedrock, slope, erodibility, cutbanks cave, slippage, differential settling, and corrosivity
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Drilling and blasting of rock or special earthmoving equipment is needed to increase the depth of these soils.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Installing permanent retaining walls helps to improve soil stability.
- These soils are subject to uneven settling and may be unstable if not properly compacted.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Local roads and streets

Suitability: Poorly suited
Management concerns: Depth to bedrock, slope, erodibility, cutbanks cave, slippage, differential settling, and frost action
Management measures and considerations:
- The underlying bedrock is susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.
- Extensive blasting, shaping, and grading are needed if roads are to be constructed on the contour.
- Designing roads on the contour and installing water-control structures, such as

broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- These soils are subject to uneven settling and may be unstable if not properly compacted.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, depth to bedrock, soil fertility, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the moderately deep rooting depth, these soils are difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- These soils are limited for lawns and landscaping because of the high amount of rock fragments in the root zone.
- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- The use of native landscape plants tolerant of droughty, acidic soils is recommended.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: VIIs

SwE—Sylco-Cataska complex, 30 to 50 percent slopes, very rocky

Setting

Landscape: Low and intermediate mountains in the northwestern and north-central parts of the county
Elevation range: 1,400 to 4,250 feet
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: As much as 161 acres

Composition

Sylco soil and similar inclusions: 45 percent

Cataska soil and similar inclusions: 35 percent
Dissimilar inclusions: 20 percent

Typical Profile

Sylco

Surface layer:
0 to 6 inches—dark yellowish brown very channery loam

Subsoil:
6 to 22 inches—brown very channery silt loam
22 to 30 inches—strong brown very channery silt loam

Bedrock:
30 to 80 inches—unweathered, hard, interbedded slate and phyllite

Cataska

Surface layer:
0 to 6 inches—yellowish brown channery loam

Subsoil:
6 to 16 inches—light yellowish brown very channery silt loam

Bedrock:
16 to 28 inches—weathered slate
28 to 80 inches—unweathered, hard slate

Soil Properties and Qualities

Depth class: Sylco—moderately deep; Cataska—shallow
Drainage class: Sylco—somewhat excessively drained; Cataska—excessively drained
General texture class: Loamy with many rock fragments
Permeability: Sylco—moderately rapid; Cataska—moderately rapid or rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Medium
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface stones and cobbles that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Extent of rock outcrop: About 10 percent on the soil surface
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock.
Depth to bedrock: Sylco—20 to 40 inches to hard bedrock; Cataska—10 to 20 inches to soft bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material; a high content of rock fragments; water movement along bedrock contacts in the Sylco soil

Minor Components

Dissimilar inclusions:

- Random areas of Soco and Stecoah soils that have soft bedrock at a depth of 20 to 60 inches
- Areas of soils that have hard bedrock at a depth of less than 10 inches; adjacent to rock outcrops
- Northcove soils that have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Maymead soils that have bedrock at a depth of more than 60 inches; on benches, in concave areas at the head of drains, and in saddles and gaps
- Random areas of soils on slopes of less than 30 percent or more than 50 percent

Similar inclusions:

- Sylco soils that have silt loam surface textures
- Soco soils that have fine sandy loam, loam, and silt loam surface textures

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for crop production because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management concerns: Equipment use, rooting depth, droughtiness, erodibility, and soil fertility
Management measures and considerations:

- This map unit is difficult to manage for pasture and hay production because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. The underlying bedrock is susceptible to mass movement. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. The underlying bedrock is susceptible to mass movement. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: VIIs

SyD—Sylco-Soco complex, 15 to 30 percent slopes, stony

Setting

Landscape: Low and intermediate mountains in the northwestern and north-central parts of the county
Elevation range: 1,400 to 4,250 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow
Size of areas: As much as 40 acres

Composition

Sylco soil and similar inclusions: 55 percent
Soco soil and similar inclusions: 40 percent
Dissimilar inclusions: 5 percent

Typical Profile

Sylco

Surface layer:
0 to 5 inches—dark yellowish brown channery loam

Subsoil:
5 to 23 inches—strong brown very channery loam

Bedrock:
23 to 80 inches—unweathered, hard phyllite

Soco

Surface layer:
0 to 5 inches—very dark grayish brown channery fine sandy loam

Subsoil:
5 to 24 inches—brown fine sandy loam
24 to 35 inches—light yellowish brown channery fine sandy loam

Bedrock:
35 to 80 inches—weathered metasandstone

Soil Properties and Qualities

Depth class: Moderately deep
Drainage class: Sylco—somewhat excessively drained; Soco—well drained
General texture class: Sylco—loamy with many rock fragments; Soco—loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe or very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum weathered from low-grade metasedimentary rock
Depth to bedrock: Sylco—20 to 40 inches to hard bedrock; Soco—20 to 40 inches to soft bedrock
Other distinctive properties: A high content of rock fragments and water movement along bedrock contacts in the Sylco soil

Minor Components

Dissimilar inclusions:
- Random areas of Stecoah soils that have soft bedrock at a depth of 40 to 60 inches
- Maymead soils that have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and in saddles and gaps
- Random areas of soils on slopes of less than 15 percent or more than 30 percent

- Areas of soils that have hard bedrock at a depth of less than 20 inches; adjacent to rock outcrops
- Widely scattered areas of rock outcrop

Similar inclusions:
- Sylco soils that have silt loam surface textures
- Soco soils that have fine sandy loam, loam, and silt loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation and pasture

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management concerns: Equipment use, erodibility, rooting depth, droughtiness, and soil fertility
Management measures and considerations:
- This map unit is difficult to manage for pasture and hay production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned clipping and harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Low for upland hardwoods
Suitability: Poorly suited
Management concerns: Equipment use, erodibility, and windthrow hazard
Management measures and considerations:
- This map unit is severely limited for timber production because of low productivity due to the limited rooting depth.
- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly

onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Extensive blasting, shaping, and grading are needed if roads are to be constructed on the contour.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Livestock should not be grazed in areas managed for woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Depth to bedrock, slope, erodibility, slippage, differential settling, and corrosivity
Management measures and considerations:
- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Drilling and blasting of rock or special earthmoving equipment is needed to increase the depth of the Sylco soil.
- The soft bedrock underlying the Soco soil is not difficult to excavate but chunks are hard to vegetate and pack into a fill slope.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- These soils are subject to uneven settling and may be unstable if not properly compacted.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Sylco—depth to bedrock, slope, and poor filtering capacity; Soco—depth to bedrock and slope
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- This map unit is difficult to manage for septic tanks and absorption fields due to the moderate depth to bedrock of these soils and the high content of rock fragments of the Sylco soil.

Local roads and streets

Suitability: Poorly suited
Management concerns: Depth to bedrock, slope, erodibility, slippage, differential settling, and frost action
Management measures and considerations:
- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.
- Extensive blasting, shaping, and grading are needed if roads are to be constructed on the contour.

- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- These soils are subject to uneven settling and may be unstable if not properly compacted.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, depth to bedrock, soil fertility, and droughtiness
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- The Sylco soil is limited for lawns and landscaping because of the high amount of rock fragments in the root zone.
- Because of the moderately deep rooting depth, these soils are difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- The use of native landscape plants that are tolerant of droughty, acidic soils is recommended.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: Sylco—VIIs; Soco—IVe

SyE—Sylco-Soco complex, 30 to 50 percent slopes, stony

Setting

Landscape: Low and intermediate mountains in the northwestern and north-central parts of the county
Elevation range: 1,400 to 4,250 feet
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: As much as 154 acres

Composition

Sylco soil and similar inclusions: 55 percent
Soco soil and similar inclusions: 40 percent
Dissimilar inclusions: 5 percent

Typical Profile

Sylco

Surface layer:
0 to 5 inches—dark yellowish brown channery loam

Subsoil:
5 to 23 inches—strong brown very channery loam

Bedrock:
23 to 80 inches—unweathered, hard phyllite

Soco

Surface layer:
0 to 5 inches—very dark grayish brown channery fine sandy loam

Subsoil:
5 to 24 inches—brown fine sandy loam
24 to 35 inches—light yellowish brown channery fine sandy loam

Bedrock:
35 to 80 inches—weathered metasandstone

Soil Properties and Qualities

Depth class: Moderately deep
Drainage class: Sylco—somewhat excessively drained; Soco—well drained
General texture class: Sylco—loamy with many rock fragments; Soco—loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Sylco—medium; Soco—low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: Sylco—20 to 40 inches to hard bedrock; Soco—20 to 40 inches to soft bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material; a high content of rock fragments and water movement along bedrock contacts in the Sylco soil

Minor Components

Dissimilar inclusions:
- Random areas of Stecoah soils that have soft bedrock at a depth of 40 to 60 inches
- Northcove soils that have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops

- Maymead soils that have bedrock at a depth of more than 60 inches; on footslopes, on benches, in concave areas at the head of drains, and in saddles and gaps
- Random areas of soils on slopes of less than 30 percent or more than 50 percent
- Areas of soils that have hard bedrock at a depth of less than 20 inches; adjacent to rock outcrops
- Widely scattered areas of rock outcrop

Similar inclusions:
- Sylco soils that have silt loam surface textures
- Soco soils that have fine sandy loam, loam, and silt loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation and pasture

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management concerns: Equipment use, erodibility, rooting depth, droughtiness, and soil fertility
Management measures and considerations:
- This map unit is difficult to manage for pasture and hay production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Low for upland hardwoods
Suitability: Poorly suited
Management concerns: Equipment use, erodibility, and windthrow hazard
Management measures and considerations:
- This map unit is severely limited for timber production because of low productivity due to the limited rooting depth of these soils.
- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.

- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Extensive blasting, shaping, and grading are needed if roads are to be constructed on the contour.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Livestock should not be grazed in areas managed for woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Depth to bedrock, slope, erodibility, slippage, differential settling, and corrosivity
Management measures and considerations:

- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Drilling and blasting of rock or special earthmoving equipment is needed to increase the depth of the Sylco soil.
- The soft bedrock underlying the Soco soil is not difficult to excavate but chunks are hard to vegetate and pack into a fill slope.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- These soils are subject to uneven settling and may be unstable if not properly compacted.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Sylco—depth to bedrock, slope, and poor filtering capacity; Soco—depth to bedrock and slope
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- This map unit is difficult to manage for septic tanks and absorption fields due to the moderate depth to bedrock of these soils and the high content of rock fragments of the Sylco soil.

Local roads and streets

Suitability: Poorly suited
Management concerns: Depth to bedrock, slope, erodibility, slippage, differential settling, and frost action
Management measures and considerations:

- The underlying bedrock may be susceptible to mass movement. An onsite

investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.
- Extensive blasting, shaping, and grading are needed if roads are to be constructed on the contour.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- These soils are subject to uneven settling and may be unstable if not properly compacted.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, depth to bedrock, soil fertility, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- The Sylco soil is limited for lawns and landscaping because of the high amount of rock fragments in the root zone.
- Because of the moderately deep rooting depth, these soils are difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- The use of native landscape plants tolerant of droughty, acidic soils is recommended.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: Sylco—VIIs; Soco—VIIe

SzF—Sylco-Soco complex, 50 to 95 percent slopes, very stony

Setting

Landscape: Low and intermediate mountains in the northwestern and north-central parts of the county
Elevation range: 1,400 to 4,250 feet
Landform: South- to west-facing mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: As much as 308 acres

Composition

Sylco soil and similar inclusions: 50 percent

Soco soil and similar inclusions: 35 percent
Dissimilar inclusions: 15 percent

Typical Profile

Sylco

Surface layer:
0 to 5 inches—dark yellowish brown channery loam

Subsoil:
5 to 23 inches—strong brown very channery loam

Bedrock:
23 to 80 inches—unweathered, hard phyllite

Soco

Surface layer:
0 to 5 inches—very dark grayish brown channery fine sandy loam

Subsoil:
5 to 24 inches—brown fine sandy loam
24 to 35 inches—light yellowish brown channery fine sandy loam

Bedrock:
35 to 80 inches—weathered metasandstone

Soil Properties and Qualities

Depth class: Moderately deep
Drainage class: Sylco—somewhat excessively drained; Soco—well drained
General texture class: Sylco—loamy with many rock fragments; Soco—loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping to moderately steep
Soil slippage potential: High
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: Sylco—20 to 40 inches to hard bedrock; Soco—20 to 40 inches to soft bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material; a high content of rock fragments and water movement along bedrock contacts in the Sylco soil

Minor Components

Dissimilar inclusions:
- Random areas of Stecoah soils that have soft bedrock at a depth of 40 to 60 inches

- Northcove soils that have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Maymead soils that have bedrock at a depth of more than 60 inches; on benches, in concave areas at the head of drains, and in saddles and gaps
- Random areas where landslides have occurred
- Random areas of soils on slopes of less than 50 percent or more than 95 percent
- Areas of soils that have hard bedrock at a depth of less than 20 inches; adjacent to rock outcrops
- Widely scattered areas of rock outcrop

Similar inclusions:
- Sylco soils that have silt loam surface textures
- Soco soils that have fine sandy loam, loam, and silt loam surface textures

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, high content of rock fragments, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for pasture and hay production because of the slope, erodibility, high content of rock fragments, and depth to bedrock. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, high content of rock fragments, and depth to bedrock. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, and depth to bedrock. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, high

content of rock fragments, and depth to bedrock. The underlying bedrock is susceptible to mass movement. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope, high content of rock fragments, and depth to bedrock. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, high content of rock fragments, and depth to bedrock. The underlying bedrock is susceptible to mass movement. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, high content of rock fragments, and depth to bedrock. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: Sylco—VIIs; Soco—VIIe

TaB—Tate loam, 2 to 8 percent slopes

Setting

Landscape: Intermountain hills and low mountains in the western, southern, and eastern parts of the county
Elevation range: 1,700 to 3,200 feet
Landform: Coves, colluvial fans, and benches
Landform position: Footslopes and toeslopes
Shape of areas: Irregular or oblong
Size of areas: As much as 29 acres

Composition

Tate soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 7 inches—brown loam

Subsoil:
7 to 46 inches—brownish yellow clay loam

Underlying material:
46 to 80 inches—brownish yellow cobbly loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid in the surface layer, moderate in the subsoil, and moderately rapid in the underlying material
Available water capacity: Moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Moderate
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, which allows late spring and early fall frosts
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:

- Random areas of Unison soils that have more clay in the subsoil than the Tate soil
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; in depressions and on toeslopes
- Somewhat poorly drained French soils that are loamy in the upper part and have strata with a high of rock fragments at a depth of 20 to 40 inches; along stream channels
- Soils that are poorly drained in areas of seeps and springs
- Areas that occasionally flood for very brief duration; along stream channels
- Soils that have surface layers with less organic matter than those of the Tate soil; in cropped fields
- Random areas of moderately eroded soils
- Random areas of soils on slopes of less than 2 percent or more than 8 percent

Similar inclusions:

- Tate soils that have fine sandy loam and sandy clay loam surface textures

Land Use

Dominant Uses: Cropland, pasture, hayland, and ornamental crops
Other Uses: Building site development, recreation, woodland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Erodibility, tilth, pesticide retention, soil fertility, and climate

Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, pesticide retention, and soil fertility
Management measures and considerations:
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Well suited
Management concerns: Erodibility, climate, pesticide retention, root disease, and soil fertility
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Due to the restricted movement of air and water caused by the clay content of the

subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and high for eastern white pine
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of organic matter in the surface layer, and the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.

Urban Development

Dwellings

Suitability: Well suited
Management concerns: Erodibility, seeps and springs, corrosivity, and large stones
Management measures and considerations:
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Excavations may unearth large stones and boulders.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, seeps and springs, slope, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may unearth large stones and boulders.

Local roads and streets

Suitability: Well suited
Management concerns: Low strength, erodibility, frost action, seeps and springs, and large stones
Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting roadbeds help to improve soil strength.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- Excavations may unearth large stones and boulders.

Lawns and landscaping

Suitability: Well suited
Management concerns: Erodibility, soil compaction, climate, pesticide retention, root disease, and soil fertility
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: IIe

TaC—Tate loam, 8 to 15 percent slopes

Setting

Landscape: Intermountain hills and low or intermediate mountains in the western, southern, and eastern parts of the county

Elevation range: 1,700 to 3,200 feet
Landform: Coves, colluvial fans, and benches
Landform position: Footslopes and toeslopes
Shape of areas: Irregular or oblong
Size of areas: As much as 60 acres

Composition

Tate soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 7 inches—brown loam

Subsoil:
7 to 46 inches—brownish yellow clay loam

Underlying material:
46 to 80 inches—brownish yellow cobbly loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid in the surface layer, moderate in the subsoil, and moderately rapid in the underlying material
Available water capacity: Moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, which allows late spring and early fall frosts
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Random areas of Unison soils that have more clay in the subsoil than the Tate soil
- Somewhat poorly drained French soils that are loamy in the upper part and have strata with a high content of rock fragments at a depth of 20 to 40 inches; along stream channels
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; in depressions, on toeslopes, and along stream channels
- Soils that are poorly drained; in areas of seeps and springs

- Areas that rarely flood for very brief duration; along stream channels
- Soils that have surface layers with less organic matter than those of the Tate soil; in cropped fields
- Random areas of moderately eroded soils
- Random areas of soils on slopes of less than 8 percent or more than 15 percent

Similar inclusions:
- Tate soils that have fine sandy loam and sandy clay loam surface textures

Land Use

Dominant Uses: Cropland, pasture, hayland, and ornamental crops
Other Uses: Building site development, recreation, woodland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Erodibility, equipment use, climate, tilth, pesticide retention, and soil fertility
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit equipment use in the steeper areas.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, equipment use, pesticide retention, and soil fertility
Management measures and considerations:
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- The slope may limit equipment use in the steeper areas when harvesting hay crops.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Well suited
Management concerns: Erodibility, equipment use, climate, pesticide retention, root disease, and soil fertility
Management measures and considerations:

- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit equipment use in the steeper areas.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and high for eastern white pine
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of organic matter in the surface layer, and the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Slope, erodibility, seeps and springs, corrosivity, and large stones
Management measures and considerations:

- Designing structures so that they conform with natural slopes helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.

- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Excavations may unearth large stones and boulders.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, slope, seeps and springs, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Excavations may unearth large stones and boulders.

Local roads and streets

Suitability: Suited
Management concerns: Low strength, slope, erodibility, frost action, seeps and springs, and large stones
Management measures and considerations:
- Incorporating sand and gravel into the roadbed and compacting roadbeds helps to improve soil strength.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- Excavations may unearth large stones and boulders.

Lawns and landscaping

Suitability: Suited
Management concerns: Slope, erodibility, soil compaction, climate, pesticide retention, root disease, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may

be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.

- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: IIIe

TaD—Tate loam, 15 to 30 percent slopes

Setting

Landscape: Intermountain hills and low or intermediate mountains in the western, southern, and eastern parts of the county
Elevation range: 1,700 to 3,200 feet
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes, footslopes, and toeslopes
Shape of areas: Irregular or oblong
Size of areas: As much as 148 acres

Composition

Tate soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 7 inches—brown loam

Subsoil:
7 to 46 inches—brownish yellow clay loam

Underlying material:
46 to 80 inches—brownish yellow cobbly loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid in the surface layer, moderate in the subsoil, and moderately rapid in the underlying material
Available water capacity: Moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed

Hazard of water erosion: Very severe
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, which allows late spring and early fall frosts
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Random areas of Unison soils that have more clay in the subsoil than the Tate soil
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; on toeslopes, in depressions, and in drainageways
- Soils that are poorly drained; in areas of seeps and springs
- Areas that rarely flood for very brief duration; along stream channels
- Soils that have surface layers with less organic matter than those of the Tate soil; in cropped fields
- Random areas of moderately eroded or severely eroded soils
- Random areas of soils on slopes of less than 15 percent or more than 30 percent

Similar inclusions:
- Tate soils that have fine sandy loam and sandy clay loam surface textures

Land Use

Dominant Uses: Pasture and hayland
Other Uses: Cropland, woodland, wildlife habitat, ornamental crops, recreation, and building site development

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Equipment use, erodibility, tilth, soil fertility, pesticide retention, and climate
Management measures and considerations:
- This soil is difficult to manage for cultivated crops because the slope limits equipment use.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Pasture and hayland

Suitability: Suited
Management concerns: Equipment use, erodibility, pesticide retention, and soil fertility
Management measures and considerations:

- The slope limits equipment use in the steeper areas.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when restablishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Suited
Management concerns: Equipment use, erodibility, climate, pesticide retention, soil fertility, and plant shape
Management measures and considerations:

- This soil is difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Erodibility and equipment use
Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly

onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of organic matter in the surface layer, and the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, seeps and springs, corrosivity, and large stones
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Excavations may unearth large stones and boulders.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope, seeps and springs, and restricted permeability
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.
- Excavations may unearth large stones and boulders.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, erodibility, frost action, large stones, seeps and springs, and low soil strength
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

- Excavations may unearth large stones and boulders.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, soil compaction, climate, pesticide retention, and soil fertility
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: IVe

TkC—Tate loam, 8 to 15 percent slopes, very stony

Setting

Landscape: Intermountain hills and low or intermediate mountains in the western, southern, and eastern parts of the county
Elevation range: 2,500 to 3,500 feet
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Footslopes and toeslopes
Shape of areas: Irregular or oblong
Size of areas: As much as 4 acres

Composition

Tate soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 7 inches—brown loam

Subsoil:
7 to 46 inches—brownish yellow gravelly sandy clay loam

Underlying material:
46 to 80 inches—brownish yellow cobbly loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid in the surface layer, moderate in the subsoil, and moderately rapid in the underlying material
Available water capacity: Moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Rock fragments on the surface: About 3 percent surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, which allows late spring and early fall frosts
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Random areas of Unison soils that have surface layers with less organic matter than those of the Tate soil and have more clay in the subsoil
- Toecane soils that have thicker surface layers with more organic matter and have more rock fragments in the subsoil; in drainageways
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; in depressions, on toeslopes, and along stream channels
- Areas that rarely flood for very brief duration; along stream channels
- Random areas of soils on slopes of less than 8 percent or more than 15 percent

Similar inclusions:
- Tate soils that have fine sandy loam and sandy clay loam surface textures

Land Use

Dominant Uses: Pasture, hayland, ornamental crops, and cropland
Other Uses: Building site development, recreation, woodland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Equipment use, erodibility, tilth, pesticide retention, soil fertility, and climate
Management measures and considerations:

- This soil is difficult to manage for cultivated crops because of the erodibility, the very stony surface, and the slope, which limits equipment use in the steeper areas.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Pasture and hayland

Suitability: Pasture—well suited; hayland—unsuited
Management concerns: Equipment use, erodibility, pesticide retention, and soil fertility
Management measures and considerations:

- The slope and surface stones limit the use of equipment and may be hazardous.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Suited
Management concerns: Equipment use, erodibility, climate, pesticide retention, root disease, and soil fertility
Management measures and considerations:

- This map unit is limited for orchard and ornamental crops because of the very stony surface and the slope, which limits equipment use in the steeper areas.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.

- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and high for eastern white pine
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to slope, the high content of organic matter in the surface layer, and the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Slope, erodibility, seeps and springs, corrosivity, and large stones
Management measures and considerations:

- Designing structures so that they conform with natural slopes helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Excavations may unearth large stones and boulders.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, slope, seeps and springs, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Excavations may unearth large stones and boulders.

Local roads and streets

Suitability: Suited
Management concerns: Low strength, slope, erodibility, frost action, seeps and springs, and large stones
Management measures and considerations:
- Incorporating sand and gravel into the roadbed and compacting roadbeds help to improve soil strength.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- Excavations may unearth large stones and boulders.

Lawns and landscaping

Suitability: Suited
Management concerns: Slope, erodibility, soil compaction, climate, pesticide retention, root disease, and soil fertility
Management measures and considerations:
- This map unit is limited for lawns and landscaping because of the very stony surface and the slope, which limits equipment use in the steeper areas.
- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the

subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: IVs

TkD—Tate loam, 15 to 30 percent slopes, very stony

Setting

Landscape: Intermountain hills and low or intermediate mountains in the western, southern, and eastern parts of the county
Elevation range: 2,500 to 3,500 feet
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes, footslopes, and toeslopes
Shape of areas: Irregular or oblong
Size of areas: As much as 19 acres

Composition

Tate soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 7 inches—brown loam

Subsoil:
7 to 46 inches—brownish yellow gravelly sandy clay loam

Underlying material:
46 to 80 inches—brownish yellow cobbly loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid in the surface layer, moderate in the subsoil, and moderately rapid in the underlying material
Available water capacity: Moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate

Special climatic conditions: Soil subject to slow air drainage, which allows late spring and early fall frost
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Colluvium derived from felsic or mafic, high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Random areas of Unison soils that have surface layers with less organic matter than those of the Tate soil and have more clay in the subsoil
- Toecane soils that have thicker surface layers with more organic matter and have more rock fragments in the subsoil; in drainageways
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; on toeslopes, in depressions, and in drainageways
- Areas that rarely flood for very brief duration; along stream channels
- Random areas of soils on slopes of less than 15 percent or more than 30 percent

Similar inclusions:
- Tate soils that have fine sandy loam and sandy clay loam surface textures

Land Use

Dominant Uses: Pasture and hayland
Other Uses: Cropland, woodland, wildlife habitat, ornamental crops, recreation, and building site development

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Equipment use, erodibility, tilth, soil fertility, pesticide retention, and climate
Management measures and considerations:
- This soil is difficult to manage for cultivated crops because of the erodibility, the very stony surface, and the slope, which limits equipment use.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Pasture and hayland

Suitability: Pasture—suited; hayland—unsuited
Management concerns: Equipment use, erodibility, pesticide retention, and soil fertility

Management measures and considerations:

- The slope and surface stones limit the use of equipment and may be hazardous.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Suited

Management concerns: Equipment use, erodibility, climate, pesticide retention, soil fertility, root disease, and plant shape

Management measures and considerations:

- This map unit is limited for orchard and ornamental crops because of the very stony surface and the slope, which limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and high for eastern white pine

Suitability: Suited

Management concerns: Erodibility and equipment use

Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very

slick due to slope, the high content of organic matter in the surface layer, and the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, seeps and springs, corrosivity, and large stones
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Excavations may unearth large stones and boulders.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope, restricted permeability, seeps and springs, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Excavations may unearth large stones and boulders.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, erodibility, low strength, frost action, seeps and springs, and large stones
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.

- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- Excavations may unearth large stones and boulders.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, soil compaction, climate, pesticide retention, root disease, and soil fertility
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: IVs

TmC—Tate-Urban land complex, 2 to 15 percent slopes

Setting

Landscape: Intermountain hills and low mountains; dominantly in the towns of Marshall and Mars Hill
Elevation range: 1,700 to 2,800 feet
Landform: Coves, drainageways, and benches
Landform position: Footslopes and toeslopes
Shape of areas: Irregular or oblong
Size of areas: As much as 30 acres

Composition

Tate soil and similar inclusions: 50 percent
Urban land: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Tate

Surface layer:
0 to 7 inches—brown loam

Subsoil:
7 to 46 inches—brownish yellow clay loam

Underlying material:
46 to 80 inches—brownish yellow fine sandy loam

Urban land

Urban land consists of areas where 85 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process of urban development. The original landscape, topography, and, commonly, the drainage pattern have been changed. Runoff is very rapid and increases the flooding hazard in low-lying areas. A typical profile is not given due to the variable nature of the soil. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Properties and Qualities of the Tate Soil

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid in the surface layer, moderate in the subsoil, and moderately rapid in the underlying material
Available water capacity: Moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, which allows late spring and early fall frosts
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Random areas of Udorthents, loamy
- Areas that are subject to frequent, occasional, or rare flooding for very brief duration; adjacent to stream channels
- Random areas of short, steep slopes
- Random areas of Unison soils that have more clay in the subsoil than the Tate soil

- Random areas of Cowee and Evard soils that have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of soils that are similar to Clifton soils and have soft bedrock at a depth of less than 60 inches
- Random areas of somewhat poorly drained French soils that are loamy in the upper part and have strata with a high of rock fragments at a depth of 20 to 40 inches
- Random areas of soils that have a seasonal high water table at a depth of less than 6.0 feet
- Random areas of severely eroded soils where underlying material is exposed at the surface

Similar inclusions:
- Tate soils that have fine sandy loam and sandy clay loam surface textures

Land Use

Dominant Uses: Building site development

Agricultural Development

Cropland

- This map unit is not managed for cropland.

Pasture and hayland

- This map unit is not managed for pasture and hayland.

Orchard and ornamental crops

- This map unit is not managed for orchard or ornamental crops.

Woodland Management and Productivity

- This map unit is not managed for timber production.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, seeps and springs, corrosivity, and large stones
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Excavations may unearth large stones and boulders.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope, restricted permeability, seeps and springs, and large stones

Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Excavations may unearth large stones and boulders.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, erodibility, low strength, frost action, seeps and springs, and large stones
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- Excavations may unearth large stones and boulders.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, soil compaction, climate, pesticide retention, root disease, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- The Tate soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: Tate—IIIe; Urban land—VIIIs

ToD—Toecane very cobbly loam, 15 to 30 percent slopes, extremely bouldery

Setting

Landscape: Low and intermediate mountains; dominantly in the western, southern, and eastern parts of the county
Elevation range: 2,000 to 4,400 feet
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes, footslopes, and toeslopes
Shape of areas: Irregular or oblong
Size of areas: As much as 7 acres

Composition

Toecane soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown very cobbly loam

Subsoil:
8 to 24 inches—yellowish brown very cobbly sandy clay loam
24 to 30 inches—dark yellowish brown very cobbly sandy loam

Underlying material:
30 to 80 inches—dark yellowish brown extremely cobbly loamy sand

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy with many rock fragments
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 15 percent surface stones and boulders that average about 10 to 48 inches in diameter and 3 to 10 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, which allows late spring and early fall frosts
Soil reaction: Extremely acid to moderately acid throughout the profile

Parent material: Colluvium derived from felsic or mafic, high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands; a high content of rock fragments

Minor Components

Dissimilar inclusions:

- Areas of rubble land in drainageways
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; in depressions and drainageways
- Soils that have bedrock at a depth of less than 6.0 feet; on the outer edge of map unit delineations
- Areas that rarely flood for very brief duration; along stream channels
- Random areas of soils on slopes of less than 15 percent or more than 30 percent

Similar inclusions:

- Toecane soils that have sandy loam and fine sandy loam surface textures

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for crop production because of the slope, erodibility, the extremely bouldery surface, and the high content of rock fragments. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, the extremely bouldery surface, and the high content of rock fragments. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, the extremely bouldery surface, and the high content of rock fragments. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for timber production because of the extremely bouldery surface, the high content of rock fragments, and low productivity. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, the extremely bouldery surface, and the high content of rock fragments. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope, the extremely bouldery surface, and the high content of rock fragments. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, the extremely bouldery surface, and the high content of rock fragments. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, the extremely bouldery surface, and the high content of rock fragments.

Interpretive Group

Land capability classification: VIIs

ToE—Toecane very cobbly loam, 30 to 50 percent slopes, extremely bouldery

Setting

Landscape: Low and intermediate mountains; dominantly in the western, southern, and eastern parts of the county
Elevation range: 2,000 to 4,400 feet
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes and footslopes
Shape of areas: Irregular or oblong
Size of areas: As much as 12 acres

Composition

Toecane soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown very cobbly loam

Subsoil:
8 to 24 inches—yellowish brown very cobbly sandy clay loam
24 to 30 inches—dark yellowish brown very cobbly sandy loam

Underlying material:
30 to 80 inches—dark yellowish brown extremely cobbly loamy sand

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy with many rock fragments
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Medium
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 15 percent surface stones and boulders that average about 10 to 48 inches in diameter and 3 to 10 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, which allows late spring and early fall frosts
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Colluvium derived from felsic or mafic, high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands; a high content of rock fragments; soil has slippage potential when saturated

Minor Components

Dissimilar inclusions:
- Areas of rubble land below rock outcrops and in drainageways
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; in depressions and drainageways
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways and on the outer edge of map unit delineations
- Random areas of soils on slopes of less than 30 percent or more than 50 percent

Similar inclusions:
- Toecane soils that have sandy loam and fine sandy loam surface textures

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited

Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, the extremely bouldery surface, and the high content of rock fragments. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, the extremely bouldery surface, and the high content of rock fragments. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, the extremely bouldery surface, and the high content of rock fragments. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of the extremely bouldery surface, the high content of rock fragments, and low productivity. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, the extremely bouldery surface, and the high content of rock fragments. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope, the extremely bouldery surface, and the high content of rock fragments. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, the extremely bouldery surface, and the high content of rock fragments. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited

Management measures and considerations:

- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, the extremely bouldery surface, and the high content of rock fragments.

Interpretive Group

Land capability classification: VIIs

TrC—Toecane-Tusquitee complex, 8 to 15 percent slopes, bouldery

Setting

Landscape: Low and intermediate mountains; dominantly in the western, southern, and eastern parts of the county
Elevation range: 1,800 to 4,800 feet
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Footslopes and toeslopes
Shape of areas: Irregular or oblong
Size of areas: As much as 65 acres

Composition

Toecane soil and similar inclusions: 50 percent
Tusquitee soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Toecane

Surface layer:
0 to 8 inches—very dark grayish brown very cobbly loam

Subsoil:
8 to 24 inches—yellowish brown very cobbly sandy clay loam
24 to 30 inches—dark yellowish brown very cobbly sandy loam

Underlying material:
30 to 80 inches—dark yellowish brown extremely cobbly loamy sand

Tusquitee

Surface layer:
0 to 8 inches—very dark grayish brown gravelly loam

Subsoil:
8 to 48 inches—brown loam

Underlying material:
48 to 80 inches—dark yellowish brown gravelly fine sandy loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Toecane—loamy with many rock fragments; Tusquitee—loamy
Permeability: Moderately rapid
Available water capacity: Toecane—low; Tusquitee—moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None

Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Rock fragments on the surface: Widely scattered surface stones and boulders that average about 10 to 48 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Toecane—low; Tusquitee—moderate
Special climatic conditions: Soils subject to slow air drainage, which allows late spring and early fall frosts
Soil reaction: Toecane—extremely acid to moderately acid throughout the profile; Tusquitee—very strongly acid to moderately acid throughout the profile
Parent material: Colluvium derived from felsic or mafic, high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soils subject to overland flow of storm water from adjacent uplands; a high content of rock fragments in the Toecane soil

Minor Components

Dissimilar inclusions:
- Areas of rubble land in drainageways
- Areas of Toecane soils where the surface fragments have been removed
- Random areas of Tate soils that have more clay in the subsoil than the Toecane and Tusquitee soils
- Random areas of soils that have surface layers with less organic matter than those of the Toecane and Tusquitee soils
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; in depressions and drainageways
- Areas that rarely flood for very brief duration; along stream channels
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways and on the outer edge of map unit delineations
- Random areas of soils on slopes of less than 8 percent or more than 15 percent

Similar inclusions:
- Toecane and Tusquitee soils that have sandy loam and fine sandy loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation, building site development, and pasture

Agricultural Development

Cropland

Suitability: Toecane—unsuited; Tusquitee—suited
Management concerns: Equipment use, erodibility, soil fertility, pesticide retention, and climate
Management measures and considerations:
- This map unit is severely limited for crop production because of the bouldery surface and the high content of rock fragments in the Toecane soil.
- The slope may limit equipment use in the steeper areas.
- Using conservation practices, such as contour farming, winter cover crops, and crop

rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Pasture and hayland

Suitability: Pasture—suited; hayland—unsuited
Management concerns: Equipment use, erodibility, pesticide retention, and soil fertility
Management measures and considerations:
- The slope and surface stones and boulders limit the use of equipment and may be hazardous.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Toecane—unsuited; Tusquitee—suited
Management concerns: Equipment use, ball and burlap harvesting erodibility, climate, pesticide retention, and soil fertility
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the bouldery surface and the high content of rock fragments in the Toecane soil.
- The slope may limit equipment use in the steeper areas.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and northern hardwoods
Suitability: Suited
Management concerns: Equipment use and erodibility
Management measures and considerations:

- Using cable logging methods helps to overcome limited road and trail construction caused by the large number of stones and boulders on the soil surface.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due the high content of organic matter in the surface layer.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.

Urban Development

Dwellings

Suitability: Toecane—poorly suited; Tusquitee—suited
Management concerns: Toecane—large stones, slope, erodibility, seeps and springs, corrosivity, and cutbanks cave; Tusquitee—large stones, slope, erodibility, seeps and springs, and corrosivity
Management measures and considerations:

- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Excavations unearth large stones and boulders.
- Designing structures so that they conform with natural slopes helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing permanent retaining walls helps to improve soil stability.

Septic tank absorption fields

Suitability: Toecane—unsuited; Tusquitee—suited
Management concerns: Toecane—large stones, slope, seeps and springs, and poor filtering capacity; Tusquitee—large stones, slope, and seeps and springs
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Excavations unearth large stones and boulders.

- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Measures that improve the filtering capacity should be considered; the Toecane soil readily absorbs but does not adequately filter effluent.

Local roads and streets

Suitability: Poorly suited
Management concerns: Toecane—large stones, slope, erodibility, seeps and springs, and differential settling; Tusquitee—large stones, slope, erodibility, seeps and springs, and frost action
Management measures and considerations:

- Excavations unearth large stones and boulders.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, helps to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible helps to prevent slippage and excessive soil erosion.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- The Toecane soil is subject to uneven settling and may be unstable if not properly compacted.
- Permanent surfacing of roads or using suitable subgrade or base material allows year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Toecane—poorly suited; Tusquitee—suited
Management concerns: Large stones, slope, erodibility, climate, pesticide retention, and soil fertility
Management measures and considerations:

- This map unit is limited for lawns and landscaping because of the bouldery surface and the high content of rock fragments in the Toecane soil.
- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: Toecane—IVs; Tusquitee—IIIe

TsD—Toecane-Tusquitee complex, 15 to 30 percent slopes, very bouldery

Setting

Landscape: Low and intermediate mountains; dominantly in the western, southern, and eastern parts of the county
Elevation range: 1,800 to 4,800 feet
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes, footslopes, and toeslopes
Shape of areas: Irregular or oblong
Size of areas: As much as 270 acres

Composition

Toecane soil and similar inclusions: 45 percent
Tusquitee soil and similar inclusions: 45 percent
Dissimilar inclusions: 10 percent

Typical Profile

Toecane

Surface layer:
0 to 8 inches—very dark grayish brown very cobbly loam

Subsoil:
8 to 24 inches—yellowish brown very cobbly sandy clay loam
24 to 30 inches—dark yellowish brown very cobbly sandy loam

Underlying material:
30 to 80 inches—dark yellowish brown extremely cobbly loamy sand

Tusquitee

Surface layer:
0 to 8 inches—very dark grayish brown gravelly loam

Subsoil:
8 to 48 inches—brown loam

Underlying material:
48 to 80 inches—dark yellowish brown gravelly fine sandy loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Toecane—loamy with many rock fragments; Tusquitee—loamy
Permeability: Moderately rapid
Available water capacity: Toecane—low; Tusquitee—moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe

Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Toecane—low; Tusquitee—moderate
Special climatic conditions: Soils subject to slow air drainage, which allows late spring and early fall frosts
Soil reaction: Toecane—extremely acid to moderately acid throughout the profile; Tusquitee—very strongly acid to moderately acid throughout the profile
Parent material: Colluvium derived from felsic or mafic, high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soils subject to overland flow of storm water from adjacent uplands; a high content of rock fragments in the Toecane soil

Minor Components

Dissimilar inclusions:
- Areas of rubble land in drainageways
- Areas of Toecane soils where the surface fragments have been removed
- Random areas of Tate soils that have more clay in the subsoil than the Toecane and Tusquitee soils
- Random areas of soils that have surface layers with less organic matter than those of the Toecane and Tusquitee soils
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; in depressions and drainageways
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways and on the outer edge of map unit delineations
- Areas that rarely flood for very brief duration; along stream channels
- Random areas of soils on slopes of less than 15 percent or more than 30 percent

Similar inclusions:
- Toecane and Tusquitee soils that have sandy loam and fine sandy loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation, building site development, and pasture

Agricultural Development

Cropland

Suitability: Toecane—unsuited; Tusquitee—poorly suited
Management concerns: Equipment use, erodibility, soil fertility, pesticide retention, and climate
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, the very bouldery surface, and the high content of rock fragments in the Toecane soil.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may

be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management concerns: Equipment use, erodibility, pesticide retention, and soil fertility
Management measures and considerations:
- The slope and surface stones and boulders limit the use of equipment and may be hazardous.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Toecane—unsuited; Tusquitee—suited
Management concerns: Equipment use, ball and burlap harvesting, erodibility, climate, pesticide retention, and soil fertility
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, very bouldery surface, and the high content of rock fragments in the Toecane soil.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and northern hardwoods
Suitability: Suited
Management concerns: Equipment use, erodibility, and pesticide retention

Management measures and considerations:
- Using cable logging methods helps to overcome limited road and trail construction caused by the large number of stones and boulders on the soil surface.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to slope and the high content of organic matter in the surface layer.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.

Urban Development

Dwellings

Suitability: Toecane—poorly suited; Tusquitee—suited
Management concerns: Toecane—slope, large stones, erodibility, seeps and springs, corrosivity, and cutbanks cave; Tusquitee—slope, large stones, erodibility, seeps and springs, and corrosivity
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Designing structures so that they conform with natural slopes helps to improve soil performance.
- Excavations unearth large stones and boulders.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing permanent retaining walls helps to improve soil stability.

Septic tank absorption fields

Suitability: Toecane—unsuited; Tusquitee—suited
Management concerns: Toecane—slope, large stones, seeps and springs, and poor filtering capacity; Tusquitee—slope, large stones, and seeps and springs
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations unearth large stones and boulders.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Measures that improve the filtering capacity should be considered; the Toecane soil readily absorbs but does not adequately filter effluent.

Local roads and streets

Suitability: Poorly suited

Management concerns: Toecane—slope, erodibility, large stones, seeps and springs, and differential settling; Tusquitee—slope, erodibility, large stones, seeps and springs, and frost action

Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Excavations unearth large stones and boulders.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- The Toecane soil is subject to uneven settling and may be unstable if not properly compacted.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited

Management concerns: Slope, erodibility, large stones, climate, pesticide retention, and soil fertility

Management measures and considerations:

- This map unit is limited for lawns and landscaping because of the slope, the very bouldery surface, and the high content of rock fragments in the Toecane soil.
- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: VIs

TsE—Toecane-Tusquitee complex, 30 to 50 percent slopes, very bouldery

Setting

Landscape: Low and intermediate mountains; dominantly in the western, southern, and eastern parts of the county

Elevation range: 1,800 to 4,800 feet

Landform: Coves, colluvial fans, drainageways, and benches

Landform position: Head slopes and footslopes

Shape of areas: Irregular or oblong
Size of areas: As much as 108 acres

Composition

Toecane soil and similar inclusions: 55 percent
Tusquitee soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Toecane

Surface layer:
0 to 8 inches—very dark grayish brown very cobbly loam

Subsoil:
8 to 24 inches—yellowish brown very cobbly sandy clay loam
24 to 30 inches—dark yellowish brown very cobbly sandy loam

Underlying material:
30 to 80 inches—dark yellowish brown extremely cobbly loamy sand

Tusquitee

Surface layer:
0 to 8 inches—very dark grayish brown gravelly loam

Subsoil:
8 to 48 inches—brown loam

Underlying material:
48 to 80 inches—dark yellowish brown gravelly fine sandy loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Toecane—loamy with many rock fragments; Tusquitee—loamy
Permeability: Moderately rapid
Available water capacity: Toecane—low; Tusquitee—moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Toecane—medium; Tusquitee—low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Toecane—low; Tusquitee—moderate
Special climatic conditions: Soils subject to slow air drainage, which allows late spring and early fall frosts
Soil reaction: Toecane—extremely acid to moderately acid throughout the profile; Tusquitee—very strongly acid to moderately acid throughout the profile
Parent material: Colluvium derived from felsic or mafic, high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soils subject to

overland flow of storm water from adjacent uplands; a high content of rock fragments in the Toecane soil; soils have slippage potential when saturated

Minor Components

Dissimilar inclusions:
- Areas of rubble land below rock outcrops and in drainageways
- Random areas of Tate soils that have more clay in the subsoil than the Toecane and Tusquitee soils
- Random areas of soils that have surface layers with less organic matter than those of the Toecane and Tusquitee soils
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; in depressions and drainageways
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways and on the outer edge of map unit delineations
- Random areas of soils on slopes of less than 30 percent or more than 50 percent

Similar inclusions:
- Toecane and Tusquitee soils that have sandy loam and fine sandy loam surface textures

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation, building site development, and pasture

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and the very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management concerns: Equipment use, erodibility, pesticide retention, and soil fertility
Management measures and considerations:
- The slope and surface stones and boulders limit the use of equipment and may be hazardous.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Unsuited

Management measures and considerations:

- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, the very bouldery surface, and the high content of rock fragments in the Toecane soil. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and northern hardwoods
Suitability: Suited
Management concerns: Equipment use and erodibility
Management measures and considerations:

- Using cable logging methods helps to overcome limited road and trail construction caused by the large number of stones and boulders on the soil surface.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope and the high content of organic matter in the surface layer.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.

Urban Development

Dwellings

Suitability: Toecane—unsuited; Tusquitee—poorly suited
Management concerns: Toecane—slope, large stones, erodibility, seeps and springs, corrosivity, and cutbanks cave; Tusquitee—slope, large stones, erodibility, seeps and springs, and corrosivity
Management measures and considerations:

- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Excavations unearth large stones and boulders.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing permanent retaining walls helps to improve soil stability.

Septic tank absorption fields

Suitability: Toecane—unsuited; Tusquitee—poorly suited
Management concerns: Toecane—large stones, slope, seeps and springs, and poor filtering capacity; Tusquitee—large stones, slope, and seeps and springs

Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Excavations unearth large stones and boulders.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Measures that improve the filtering capacity should be considered; the Toecane soil readily absorbs but does not adequately filter effluent.

Local roads and streets

Suitability: Poorly suited
Management concerns: Toecane—slope, erodibility, large stones, seeps and springs, and differential settling; Tusquitee—slope, erodibility, large stones, seeps and springs, and frost action
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Excavations unearth large stones and boulders.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- The Toecane soil is subject to uneven settling and may be unstable if not properly compacted.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, large stones, climate, pesticide retention, and soil fertility
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, the very bouldery surface, and the high content of rock fragments in the Toecane soil.
- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: VIIs

TuD—Tusquitee-Toecane complex, 15 to 30 percent slopes, stony

Setting

Landscape: Intermountain hills and low or intermediate mountains in the western, southern, and eastern parts of the county
Elevation range: 1,800 to 4,000 feet
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes, footslopes, and toeslopes
Shape of areas: Irregular or oblong
Size of areas: As much as 39 acres

Composition

Tusquitee soil and similar inclusions: 65 percent
Toecane soil and similar inclusions: 25 percent
Dissimilar inclusions: 10 percent

Typical Profile

Tusquitee

Surface layer:
0 to 8 inches—very dark grayish brown gravelly loam

Subsoil:
8 to 48 inches—brown loam

Underlying material:
48 to 80 inches—dark yellowish brown gravelly fine sandy loam

Toecane

Surface layer:
0 to 8 inches—very dark grayish brown very cobbly loam

Subsoil:
8 to 24 inches—yellowish brown very cobbly sandy clay loam
24 to 30 inches—dark yellowish brown very cobbly sandy loam

Underlying material:
30 to 80 inches—dark yellowish brown extremely cobbly loamy sand

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Tusquitee—loamy; Toecane—loamy with many rock fragments
Permeability: Moderately rapid
Available water capacity: Tusquitee—moderate; Toecane—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe

Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Tusquitee—moderate; Toecane—low
Special climatic conditions: Soils subject to slow air drainage, which allows late spring and early fall frosts
Soil reaction: Tusquitee—very strongly acid to moderately acid throughout the profile; Toecane—extremely acid to moderately acid throughout the profile
Parent material: Colluvium derived from felsic or mafic, high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soils subject to overland flow of storm water from adjacent upland; a high content of rock fragments in the Toecane soil

Minor Components

Dissimilar inclusions:

- Random areas of Tate soils that have more clay in the subsoil than the Tusquitee and Toecane soils
- Random areas of soils that have surface layers with less organic matter than those of the Tusquitee and Toecane soils
- Areas of very bouldery to extremely bouldery soils or rubble land; in drainageways
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; on toeslopes, in depressions, and in drainageways
- Soils that have bedrock at a depth of less than 6.0 feet; on the outer edge of map unit delineations
- Areas that rarely flood for very brief duration; along stream channels
- Random areas of moderately to severely eroded soils
- Random areas of soils on slopes of less than 15 percent or more than 30 percent

Similar inclusions:

- Tusquitee and Toecane soils that have sandy loam and fine sandy loam surface textures

Land Use

Dominant Uses: Pasture and hayland
Other Uses: Cropland, woodland, wildlife habitat, ornamental crops, recreation, and building site development

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Equipment use, erodibility, tilth, soil fertility, pesticide retention, and climate
Management measures and considerations:

- These soils are difficult to manage for cultivated crops because of the slope, which limits equipment use, and the high content of rock fragments in the Toecane soil.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may

be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Pasture and hayland

Suitability: Suited
Management concerns: Equipment use, erodibility, pesticide retention, and soil fertility
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- The Toecane soil is limited because of the high content of rock fragments in the root zone.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Tusquitee—suited; Toecane—unsuited
Management concerns: Tusquitee—equipment use, erodibility, climate, pesticide retention, soil fertility, and plant shape; Toecane—equipment use, erodibility, climate, pesticide retention, soil fertility, plant shape, and ball and burlap harvesting
Management measures and considerations:
- These soils are difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- The Toecane soil is severely limited for ball and burlap harvesting because of the high amount of rock fragments in the root zone.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- The slope affects the shape of ornamentals on the uphill side.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and northern hardwoods
Suitability: Suited
Management concerns: Erodibility and equipment use
Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due the high content of organic matter in the surface layer.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.

Urban Development

Dwellings

Suitability: Tusquitee—suited; Toecane—poorly suited
Management concerns: Tusquitee—slope, erodibility, seeps and springs, large stones, and corrosivity; Toecane—slope, erodibility, seeps and springs, large stones, corrosivity, and cutbanks cave
Management measures and considerations:

- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Excavations may unearth large stones and boulders.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing permanent retaining walls helps to improve soil stability.

Septic tank absorption fields

Suitability: Tusquitee—suited; Toecane—poorly suited
Management concerns: Slope, seeps and springs, and poor filtering capacity
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Measures that improve the filtering capacity should be considered; the Toecane soil readily absorbs but does not adequately filter effluent.
- Excavations may unearth large stones and boulders.

Local roads and streets

Suitability: Poorly suited
Management concerns: Toecane—slope, erodibility, seeps and springs, large stones, and differential settling; Tusquitee—slope, erodibility, seeps and springs, large stones, and frost action
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- Excavations unearth large stones and boulders.
- The Toecane soil is subject to uneven settling and may be unstable if not properly compacted.

Lawns and landscaping

Suitability: Tusquitee—suited; Toecane—poorly suited
Management concerns: Tusquitee—slope, erodibility, soil compaction, climate, pesticide retention, and soil fertility; Toecane—slope, erodibility, soil compaction, climate, pesticide retention, soil fertility, and large stones
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- The Toecane soil is severely limited for lawns and landscaping because of the high content of rock fragments in the root zone.

Interpretive Group

Land capability classification: Tusquitee—IVe; Toecane—VIs

TwB—Tusquitee-Whiteside complex, 2 to 8 percent slopes

Setting

Landscape: Mountain valleys of the intermountain hills and low mountains in the western, southern, and eastern parts of the county

Elevation range: 2,000 to 4,000 feet
Landform: Coves, colluvial fans, and benches
Landform position: Concave to planar toeslopes
Shape of areas: Irregular or oblong
Size of areas: As much as 12 acres

Composition

Tusquitee soil and similar inclusions: 55 percent
Whiteside soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Tusquitee

Surface layer:
0 to 8 inches—very dark grayish brown loam

Subsoil:
8 to 48 inches—brown loam
48 to 80 inches—dark yellowish brown gravelly fine sandy loam

Whiteside

Surface layer:
0 to 11 inches—very dark grayish brown loam

Subsoil:
11 to 37 inches—yellowish brown loam that has mottles in shades of red and brown

Underlying material:
37 to 80 inches—light brownish gray fine sandy loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Tusquitee—well drained; Whiteside—moderately well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Tusquitee—moderate; Whiteside—moderate or high
Depth to seasonal high water table: Tusquitee—more than 6.0 feet; Whiteside—2.0 to 3.0 feet from December through May and 2.0 to 3.5 feet from June through November
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Moderate
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Tusquitee—colluvium; Whiteside—colluvium and old alluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soils subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Moderately well drained Dellwood and Reddies soils that are loamy in the upper part and have strata with a high content of rock fragments at a depth of 8 to 40 inches; along stream channels
- Somewhat poorly drained French soils that have subsoils that are loamy in the upper part and have strata with a high content of rock fragments at a depth of 20 to 40 inches; along stream channels
- Soils that have surface layers with less organic matter than those of the Tusquitee and Whiteside soils; in cropped fields
- Very poorly drained Hemphill soils that have clayey subsoils in depressions and backwater areas
- Areas that occasionally flood for very brief duration; along stream channels
- Random areas of soils on slopes of less than 2 percent or more than 8 percent

Similar inclusions:
- Tusquitee soils that have sandy loam and fine sandy loam surface textures
- Whiteside soils that have sandy loam and fine sandy loam surface textures

Land Use

Dominant Uses: Hayland, pasture, and cropland
Other Uses: Recreation, wildlife habitat, and building site development

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Erodibility, climate, tilth, pesticide retention, and soil fertility
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, pesticide retention, and soil fertility
Management measures and considerations:
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.

- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Tusquitee—well suited; Whiteside—poorly suited
Management concerns: Tusquitee—erodibility, climate, root disease, seeps and springs, and soil fertility; Whiteside—erodibility, climate, root disease, seeps and springs, soil fertility, and wetness
Management measures and considerations:

- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content of the Whiteside subsoil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and very high for eastern white pine
Suitability: Well suited
Management concerns: Erodibility
Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to slope, the high content of organic matter in the surface layer, and the clay content of the subsoil in the Whiteside soil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.

Urban Development

Dwellings

Suitability: Tusquitee—suited; Whiteside—poorly suited
Management concerns: Tusquitee—erodibility, seeps and springs, corrosivity, and

large stones; Whiteside—erodibility, seeps and springs, corrosivity, large stones, and wetness

Management measures and considerations:

- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for dwellings.
- This map unit is difficult to manage for dwellings due to a seasonal high water table at a depth of 2.0 to 3.0 feet in areas of the Whiteside soil.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Excavations may unearth large stones and boulders.

Septic tank absorption fields

Suitability: Tusquitee—suited; Whiteside—poorly suited

Management concerns: Tusquitee—seeps and springs, large stones, and wetness; Whiteside—seeps and springs, large stones, wetness, and restricted permeability

Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for septic tank absorption fields.
- This map unit is difficult to manage for septic tank absorption fields due to a seasonal high water table at a depth of 2.0 to 3.0 feet in areas of the Whiteside soil.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Excavations may unearth large stones and boulders.

Local roads and streets

Suitability: Tusquitee—suited; Whiteside—poorly suited

Management concerns: Tusquitee—erodibility, seeps and springs, large stones, and wetness; Whiteside—erodibility, seeps and springs, large stones, wetness, and low soil strength

Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- When the soil is wet, unsurfaced roads are highly erodible and very slick due the content of silt and clay in the subsoil in the Whiteside soil.
- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.
- Excavations may unearth large stones and boulders.

Lawns and landscaping

Suitability: Suited

Management concerns: Tusquitee—erodibility, climate, root disease, soil fertility, and wetness; Whiteside—erodibility, climate, root disease, soil fertility, wetness, and soil compaction

Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration. Vegetating disturbed areas and using erosion-control structures such as sediment fences help to keep eroding soil onsite.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- In areas where water concentrates, such as drainageways, Fraser fir and other

ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content in the subsoil of the Whiteside soil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.

Interpretive Group

Land capability classification: IIe

TwC—Tusquitee-Whiteside complex, 8 to 15 percent slopes

Setting

Landscape: Mountain valleys of the intermountain hills and low mountains in the western, southern, and eastern parts of the county
Elevation range: 2,000 to 4,000 feet
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Concave to planar footslopes and toeslopes
Shape of areas: Irregular or oblong
Size of areas: As much as 33 acres

Composition

Tusquitee soil and similar inclusions: 55 percent
Whiteside soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Tusquitee

Surface layer:
0 to 8 inches—very dark grayish brown loam

Subsoil:
8 to 48 inches—brown loam
48 to 80 inches—dark yellowish brown gravelly fine sandy loam

Whiteside

Surface layer:
0 to 11 inches—very dark grayish brown loam

Subsoil:
11 to 37 inches—yellowish brown loam that has mottles in shades of red and brown

Underlying material:
37 to 80 inches—light brownish gray fine sandy loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Tusquitee—well drained; Whiteside—moderately well drained

General texture class: Loamy
Permeability: Moderate
Available water capacity: Tusquitee—moderate; Whiteside—moderate or high
Depth to seasonal high water table: Tusquitee—more than 6.0 feet; Whiteside—2.0 to 3.0 feet from December through May and 2.0 to 3.5 feet from June through November
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Tusquitee—colluvium; Whiteside—colluvium and old alluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soils subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Soils that have surface layers with less organic matter than the Tusquitee and Whiteside soils; in cropped fields
- Areas that rarely flood for very brief duration; along stream channels
- Random areas of soils on slopes of less than 8 percent or more than 15 percent

Similar inclusions:
- Tusquitee soils that have sandy loam and fine sandy loam surface textures
- Whiteside soils that have sandy loam and fine sandy loam surface textures

Land Use

Dominant Uses: Hayland, pasture, and cropland
Other Uses: Recreation, wildlife habitat, and building site development

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Erodibility, equipment use, climate, tilth, pesticide retention, and soil fertility
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit equipment use in the steeper areas.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may

be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, equipment use, pesticide retention, and soil fertility
Management measures and considerations:
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- The slope may limit equipment use in the steeper areas when harvesting hay crops.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Tusquitee—well suited; Whiteside—poorly suited
Management concerns: Tusquitee—erodibility, equipment use, climate, root disease, seeps and springs, and soil fertility; Whiteside—erodibility, equipment use, climate, root disease, seeps and springs, soil fertility, and wetness
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit equipment use in the steeper areas.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content of the subsoils of the Whiteside soil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and very high for eastern white pine
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly

onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of organic matter in the surface layer, and the clay content of the subsoil of the Whiteside soil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.

Urban Development

Dwellings

Suitability: Tusquitee—suited; Whiteside—poorly suited
Management concerns: Tusquitee—slope, erodibility, seeps and springs, corrosivity, and large stones; Whiteside—slope, erodibility, seeps and springs, corrosivity, large stones, and wetness
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for dwellings.
- This map unit is difficult to manage for dwellings due to a seasonal high water table at a depth of 2.0 to 3.0 feet in areas of the Whiteside soil.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Excavations may unearth large stones and boulders.

Septic tank absorption fields

Suitability: Tusquitee—suited; Whiteside—poorly suited
Management concerns: Tusquitee—slope, seeps and springs, and large stones; Whiteside—slope, seeps and springs, large stones, wetness, and restricted permeability
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for septic tank absorption fields.
- This map unit is difficult to manage for septic tank absorption fields due to a seasonal high water table at a depth of 2.0 to 3.0 feet in areas of the Whiteside soil.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Excavations may unearth large stones and boulders.

Local roads and streets

Suitability: Tusquitee—suited; Whiteside—poorly suited
Management concerns: Tusquitee—erodibility, seeps and springs, and wetness; Whiteside—erodibility, seeps and springs, wetness, and low soil strength
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- When the soil is wet, unsurfaced roads are highly erodible and very slick due the content of silt and clay in the subsoil of the Whiteside soil.

- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.

Lawns and landscaping

Suitability: Suited
Management concerns: Tusquitee—slope, erodibility, climate, pesticide retention, root disease, soil fertility, and wetness; Whiteside—slope, erodibility, climate, pesticide retention, root disease, soil fertility, wetness, and soil compaction
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating disturbed areas and using erosion-control structures such as sediment fences help to keep eroding soil onsite.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content of the subsoil in the Whiteside soil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.

Interpretive Group

Land capability classification: IIIe

UcB—Udifluvents, sandy, 0 to 5 percent slopes, frequently flooded

Setting

Landscape: Mountain valleys, dominantly along the French Broad River
Elevation range: 1,250 to 1,700 feet
Landform: Flood plains and river islands
Landform position: Planar to slightly convex bottomland slopes
Shape of areas: Irregular
Size of areas: As much as 22 acres

Composition

Udifluvents and similar inclusions: 95 percent
Dissimilar inclusions: 5 percent

Typical Profile

This map unit consists of very low-lying, riverwash areas that are subject to scouring and deposition during flooding. Areas include small islands and areas inside river bends of the French Broad River. A typical profile is not given due to the variable nature of the soil.

Soil Properties and Qualities

Note: Properties are variable and dependent on the extent of disturbance by flooding.

Depth class: Very deep
Drainage class: Excessively drained
General texture class: Sandy
Permeability: Very rapid
Available water capacity: Very low
Depth to seasonal high water table: 3.5 to 5 feet from January through December
Hazard of flooding: Frequent; throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Nearly level or gently sloping
Soil slippage potential: None
Hazard of water erosion: Very severe
Organic matter content of surface layer: Very low
Potential frost action: Low
Reaction: Extremely acid to moderately acid throughout the profile
Parent material: Recent alluvium derived from felsic or mafic, high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Soils subject to scouring and deposition during flooding

Minor Components

Dissimilar inclusions:

- Random areas of moderately well drained Dellwood and Reddies soils that are loamy in the upper part and have strata with a high content of rock fragments at a depth of 8 to 40 inches
- Well drained Biltmore soils that have sandy subsoils; in higher-lying areas
- Random areas where depth to bedrock is less than 60 inches
- Moderately well drained to poorly drained soils that have loamy to sandy subsoils; on low stream terraces, in depressions, and in backwater areas
- Areas of soils on slopes of more than 5 percent; along stream channels

Similar inclusions:

- Soils that are similar to Udifluvents but have loamy underlying material

Land Use

Dominant Uses: Wildlife habitat
Other Uses: Recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for crop production because of frequent flooding. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited

Management measures and considerations:

- This map unit is severely limited for the production of pasture and hay crops because of frequent flooding. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for orchard and ornamental crops because of frequent flooding. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for timber production because of frequent flooding and very low woodland productivity. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for dwellings because of frequent flooding. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for septic tank absorption fields because of frequent flooding and poor filtering capacity. Contact the local Health Department for additional guidance.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for roads and streets because of frequent flooding. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for lawns and landscaping because of frequent flooding. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: VIs

Ud—Udorthents, loamy

Setting

Landscape: Intermountain hills and low or intermediate mountains; dominantly in the northwestern, central, and southern parts of the county
Elevation range: 1,500 to 3,800 feet

Landform: Ridges, hillslopes, mountain slopes, coves, stream terraces, and flood plains
Landform position: Summits, side slopes, footslopes, toeslopes, and bottomland
Shape of areas: Irregular
Size of areas: As much as 137 acres

Composition

Udorthents and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

This map unit consists of cut and fill areas where soil and the underlying material has been removed and placed on an adjacent site. Areas include highway right-of-way corridors and building sites. Other included areas are landfills and borrow pits. A typical profile is not given due to the variable nature of the soil.

Soil Properties and Qualities

Note: Properties are variable and dependent on the type of fill material used or the type of rock exposed at the surface.

Depth class: Deep or very deep
Drainage class: Somewhat excessively drained to moderately well drained
General texture class: Loamy
Permeability: Very rapid to slow
Available water capacity: Low or moderate
Depth to seasonal high water table: Variable; occasionally 3 to 6 feet and more commonly more than 6 feet from January through December
Hazard of flooding: Variable; commonly none or rare throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Nearly level to moderately steep; sides can be very steep to nearly vertical
Soil slippage potential: Medium
Hazard of water erosion: Moderate to very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones about 3 to 24 inches in diameter and more than 100 feet apart
Organic matter content of surface layer: Low
Potential frost action: Low
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Loamy fill material
Depth to bedrock: Excavated areas—bedrock commonly exposed at or near the soil surface; fill areas—40 to more than 60 inches
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and subject to differential settling

Minor Components

Dissimilar inclusions:

- Urban land
- Areas that contain asphalt, wood, glass, and other waste material
- Areas of undisturbed soils around the edge of the map unit delineations
- Areas that have bedrock at a depth of less than 40 inches
- Areas that have stones and boulders on the soil surface
- Areas that are subject to frequent, occasional, or rare flooding for very brief duration; adjacent to stream channels

- Random areas that are somewhat poorly drained or poorly drained
- Random areas of short, steep to nearly vertical slopes

Similar inclusions:
- Soils that are similar to Udorthents but that have sandy or clayey underlying material

Land Use

Dominant Uses: Highway right-of-way corridors
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of highly variable soil properties. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Highly disturbed soils
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of highly variable soil properties. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Undetermined
Suitability: Poorly suited
Management concerns: Highly disturbed soils
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Planting the appropriate species, as recommended by a forester, helps to achieve maximum productivity and helps to ensure planting success.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Erodibility and highly disturbed soils
Management measures and considerations:
- This map unit is severely limited for dwellings or small commercial buildings because of highly variable soil properties.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Septic tank absorption fields

Suitability: Unsuited

Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of highly variable soil properties. Contact the local Health Department for additional guidance.

Local roads and streets

Suitability: Poorly suited
Management concerns: Erodibility and highly disturbed soils
Management measures and considerations:
- This map unit is severely limited for roads and streets because of highly variable soil properties.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Erodibility and highly disturbed soils
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of highly variable soil properties.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Group

Land capability classification: VIIe

UfB—Udorthents-Urban land complex, 0 to 5 percent slopes, occasionally flooded

Setting

Landscape: Mountain valleys, dominantly along the French Broad River at the towns of Hot Springs and Marshall
Elevation range: 1,400 to 1,700 feet
Landform: Stream terraces and flood plains
Landform position: Toeslopes and bottomland
Shape of areas: Irregular
Size of areas: As much as 24 acres

Composition

Udorthents and similar inclusions: 60 percent
Urban land: 30 percent
Dissimilar inclusions: 10 percent

Typical Profile

Udorthents

Udorthents consist of cut and fill areas where soil and the underlying material has been removed and placed on an adjacent site. Areas include highways, building sites, and recreational areas such as parks, river access points, and campgrounds. Also included are depressions filled with construction debris and covered with soil material. A typical profile is not given due to the variable nature of the soil.

Urban land

Urban land consists of areas where 85 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process of urban development. The original landscape, topography, and, commonly, the drainage pattern have been changed. Runoff is very rapid and increases the flooding hazard in low-lying areas. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Properties and Qualities of Udorthents

Note: Properties are variable and dependent on the type of fill material used or the type of rock exposed at the surface.

Depth class: Deep or very deep
Drainage class: Somewhat excessively drained to moderately well drained
General texture class: Loamy
Permeability: Very rapid to slow
Available water capacity: Low or moderate
Depth to seasonal high water table: Variable; occasionally 3 to 6 feet and more commonly more than 6 feet from January through December
Hazard of flooding: Occasional; throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Nearly level or gently sloping
Hazard of water erosion: Moderate to very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Loamy fill material
Depth to bedrock: 40 to more than 60 inches in fill areas
Other distinctive properties: Soils subject to differential settling

Minor Components

Dissimilar inclusions:
- Areas that contain asphalt, wood, glass, and other waste material
- Areas of undisturbed soils around the edge of the map unit delineations
- Areas that have boulders on the soil surface
- Areas that are subject to frequent, occasional, or rare flooding for very brief duration; adjacent to stream channels
- Random areas that are moderately well drained to poorly drained
- Random areas of short, steep to nearly vertical slopes

Similar inclusions:
- Soils that are similar to Udorthents but that have sandy or clayey underlying material

Land Use

- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Interpretive Group

Land capability classification: Udorthents—VIIs; Urban land—VIIIs

UhE—Udorthents-Urban land complex, 2 to 50 percent slopes

Setting

Landscape: Intermountain hills and low and intermediate mountains; dominantly in the towns of Marshall, Mars Hill, and Hot Springs and along highways corridors
Elevation range: 1,500 to 3,800 feet
Landform: Ridges, hillslopes, mountain slopes, coves, stream terraces, and flood plains
Landform position: Summits, side slopes, footslopes, and toeslopes
Shape of areas: Irregular
Size of areas: As much as 1,418 acres

Composition

Udorthents and similar inclusions: 55 percent
Urban land: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Udorthents

Udorthents consists of cut and fill areas where soil and the underlying material have been removed and placed on an adjacent site. Areas include major highway right-of-way corridors, building sites, quarries, and recreational areas such as ball fields. A typical profile is not given due to the variable nature of the soil.

Urban land

Urban land consists of areas where 85 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process of urban development. The original landscape, topography, and, commonly, the drainage pattern have been changed. Runoff is very rapid and increases the flooding hazard in low-lying areas.

Properties and Qualities of Udorthents

Note: Properties are variable and dependent on the type of fill material used or the type of rock exposed at the surface.

Depth class: Deep or very deep
Drainage class: Somewhat excessively drained to moderately well drained
General texture class: Loamy
Permeability: Very rapid to slow
Available water capacity: Low or moderate
Depth to seasonal high water table: Variable; occasionally 3 to 6 feet and more commonly more than 6 feet from January through December
Hazard of flooding: Variable; commonly none or rare throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Nearly level to steep
Soil slippage potential: Medium
Hazard of water erosion: Moderate to very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low

Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Loamy fill material
Depth to bedrock: Excavated areas—bedrock commonly exposed at or near the soil surface; fill areas—40 to more than 60 inches
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling

Minor Components

Dissimilar inclusions:
- Areas that contain asphalt, wood, glass, and other waste material
- Areas of undisturbed soils around the edge of the map unit delineations
- Areas that have bedrock at a depth of less than 40 inches
- Areas that have boulders on the soil surface
- Areas that are subject to frequent, occasional, or rare flooding for very brief duration; adjacent to stream channels
- Random areas that are moderately well drained to poorly drained
- Random areas of short, very steep to nearly vertical slopes

Similar inclusions:
- Soils that are similar to Udorthents but have sandy or clayey underlying material

Land Use

- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Interpretive Group

Land capability classification: Udorthents—VIIs; Urban land—VIIIs

UkE—Unaka-Rock outcrop complex, 30 to 50 percent slopes, very bouldery

Setting

Landscape: Low and intermediate mountains; dominantly in the northeastern, southeastern, and southwestern parts of the county
Elevation range: 3,000 to 4,800 feet
Landform: North- to east-facing ridges and mountain slopes and those shaded by higher mountains
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: As much as 14 acres

Composition

Unaka soil and similar inclusions: 40 percent
Rock outcrop: 35 percent
Dissimilar inclusions: 25 percent

Typical Profile

Unaka

Surface layer:
0 to 9 inches—very dark brown loam

Subsoil:
9 to 27 inches—dark yellowish brown gravelly loam

Bedrock:
27 to 31 inches—weathered, biotite gneiss
31 to 80 inches—unweathered, hard, biotite gneiss

Rock outcrop

This part of the map unit consists of outcrops of predominantly granite and biotite gneiss bedrock.

Properties and Qualities of the Unaka Soil

Depth class: Moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Medium
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soil subject to cooler annual air temperatures, which allows late spring and early fall frosts, and to higher soil moisture content due to north- to east-facing aspects or shading by higher mountains
Soil reaction: Very strongly acid or strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: 20 to 40 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts; soil subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Random areas of Porters soils that have hard bedrock at a depth of 40 to 60 inches
- Toecane soils that have more rock fragments in the subsoil than the Unaka soil and have bedrock at a depth of more than 60 inches; below rock outcrops and in drainageways
- Tusquitee soils that have bedrock at a depth of more than 60 inches; in concave areas at the head of drains, on footslopes, and on benches
- Chestnut soils that have thinner surface layers with less organic matter and have soft bedrock at a depth of 20 to 40 inches; on shoulder slopes and spur ridges
- Random areas of soils that have hard bedrock at a depth of less than 20 inches
- Random areas of soils on slopes of less than 30 percent or more than 50 percent
- Areas of rubble land below rock outcrops and in drainageways

- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Unaka soils that have fine sandy loam surface textures

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for pasture and hay production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited

Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: Unaka—VIIe; Rock outcrop—VIIIs

UkF—Unaka-Rock outcrop complex, 50 to 95 percent slopes, very bouldery

Setting

Landscape: Low and intermediate mountains; dominantly in the northeastern, southeastern, and southwestern parts of the county
Elevation range: 3,000 to 4,800 feet
Landform: North- to east-facing mountain slopes and those shaded by higher mountains
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: As much as 45 acres

Composition

Unaka soil and similar inclusions: 40 percent
Rock outcrop: 35 percent
Dissimilar inclusions: 25 percent

Typical Profile

Unaka

Surface layer:
0 to 9 inches—very dark brown loam

Subsoil:
9 to 27 inches—dark yellowish brown gravelly loam

Bedrock:
27 to 31 inches—weathered, biotite gneiss
31 to 80 inches—unweathered, hard, biotite gneiss

Rock outcrop

This part of the map unit consists of outcrops of predominantly granite and biotite gneiss bedrock.

Properties and Qualities of the Unaka Soil

Depth class: Moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: High
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soil subject to cooler annual air temperatures, which allow late spring and early fall frosts, and to higher soil moisture content due to north- to east-facing aspects or shading by higher mountains
Soil reaction: Very strongly acid or strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: 20 to 40 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts; soil subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:

- Random areas of Porters soils that have hard bedrock at a depth of 40 to 60 inches
- Toecane soils that have more rock fragments in the subsoil than the Unaka soil and have bedrock at a depth of more than 60 inches; below rock outcrops and in drainageways
- Tusquitee soils that have bedrock at a depth of more than 60 inches; in concave areas at the head of drains, on footslopes, and on benches
- Chestnut soils that have thinner surface layers with less organic matter and have soft bedrock at a depth of 20 to 40 inches; on shoulder slopes and spur ridges
- Random areas of soils that have hard bedrock at a depth of less than 20 inches
- Random areas of soils on slopes of less than 50 percent or more than 95 percent
- Areas of rubble land below rock outcrops and in drainageways
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:

- Unaka soils that have fine sandy loam surface textures

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for pasture and hay production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: Unaka—VIIe; Rock outcrop—VIIIs

UrD—Unicoi-Rock outcrop complex, 8 to 30 percent slopes, very bouldery

Setting

Landscape: Low and intermediate mountains; dominantly in the northwestern and northern parts of the county
Elevation range: 1,400 to 3,950 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow
Size of areas: As much as 42 acres

Composition

Unicoi soil and similar inclusions: 60 percent
Rock outcrop: 30 percent
Dissimilar inclusions: 10 percent

Typical Profile

Unicoi

Surface layer:
0 to 5 inches—dark grayish brown cobbly sandy loam

Subsoil:
5 to 16 inches—yellowish brown very cobbly sandy loam

Bedrock:
16 to 80 inches—unweathered, hard, arkosic metasandstone and quartzite

Rock outcrop

This part of the map unit consists of outcrops of predominantly arkosic metasandstone and quartzite bedrock.

Soil Properties and Qualities

Depth class: Shallow
Drainage class: Somewhat excessively drained
General texture class: Loamy with many rock fragments
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping to moderately steep

Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: 10 to 20 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts; low natural fertility

Minor Components

Dissimilar inclusions:

- Maymead soils that have bedrock at a depth of more than 60 inches; in saddles and gaps
- Random areas of Soco and Stecoah soils that have soft bedrock at a depth of 20 to 60 inches
- Random areas of soils that have hard bedrock at a depth of more than 20 inches
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round
- Random areas of soils on slopes of less than 8 percent or more than 30 percent

Similar inclusions:

- Unicoi soils that have fine sandy loam surface textures

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for pasture and hay production because of erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for orchard and ornamental crops because of erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for timber production because of erodibility, low productivity, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for dwellings because of erodibility, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for septic tank absorption fields because of depth to bedrock, extent of rock outcrops, and a very bouldery surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for roads and streets because of erodibility, depth to bedrock, extent of rock outcrops, and a very bouldery surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: Unicoi—VIIs; Rock outcrop—VIIIs

UsB—Unison loam, 2 to 8 percent slopes

Setting

Landscape: Mountain valleys of low mountains; dominantly in areas of Shelton Laurel and Spring Creeks and in the intermountain hills and low mountains in the northwestern and southeastern parts of the county
Elevation range: 1,350 to 2,500 feet
Landform: Coves and high stream terraces
Landform position: Footslopes, toeslopes, and benches
Shape of areas: Long and narrow or irregular
Size of areas: As much as 19 acres

Composition

Unison soil and similar inclusions: 90 percent
Dissimilar inclusions: 10 percent

Typical Profile

Surface layer:
0 to 10 inches—dark yellowish brown loam

Subsoil:
10 to 49 inches—strong brown clay
49 to 80 inches—strong brown gravelly clay loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Moderate
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Moderate
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, which allows late spring and early fall frosts
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Old alluvium and colluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: High clay content subsoil; random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Soils that are moderately eroded; in cropped fields
- Random areas of Tate soils that have less clay in the subsoil than the Unison soil
- Moderately well drained to poorly drained soils in depressions and on toeslopes
- Somewhat poorly drained French soils that are loamy in the upper part and have strata with a high content of rock fragments at a depth of 20 to 40 inches; along stream channels
- Urban land in and around the towns of Hot Springs and Mars Hill
- Udorthents, loamy, in and around the towns of Hot Springs and Mars Hill

Similar inclusions:
- Unison soils that have fine sandy loam, silt loam, and sandy clay loam surface textures

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Erodibility, tilth, root penetration, pesticide retention, soil fertility, and climate
Management measures and considerations:

- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Chisel plowing and subsoiling helps to break through clay pans, which allows increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, root penetration, pesticide retention, and soil fertility
Management measures and considerations:

- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- Using perennial grasses and legumes helps to penetrate and break up the clayey root zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Orchards—well suited; ornamentals—suited

Management concerns: Erodibility, root disease, climate, ball and burlap harvesting, pesticide retention, and soil fertility

Management measures and considerations:

- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Due to the restricted movement of air and water caused by the high content of clay of the subsoil, phytophthora root disease severely limits the production of Fraser fir and other susceptible ornamentals due to phytophthora root disease.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent fracture or deformation of the ball and tearing of plant roots.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Woodland Management and Productivity

Potential for commercial species: High for cove hardwoods and eastern white pine

Suitability: Well suited

Management concerns: Erodibility and equipment use

Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not be grazed in areas managed for woodland.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Well suited

Management concerns: Erodibility, high clay content, shrink-swell potential, corrosivity, seeps and springs, and large stones

Management measures and considerations:

- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- The soil is slippery and sticky when wet and slow to dry.

- Reinforcing foundations and footings or backfilling with coarse textured material helps to strengthen buildings and prevents the damage caused by shrinking and swelling.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Excavations may unearth large stones.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, high clay content, seeps and springs, and large stones
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Excavations may unearth large stones.

Local roads and streets

Suitability: Well suited
Management concerns: Low strength, high clay content, erodibility, frost action, and seeps and springs
Management measures and considerations:

- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric, filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- The soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases soil strength, allows for year-round use, and helps to reduce the damage from frost heave.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.

Lawns and landscaping

Suitability: Suited
Management concerns: Erodibility, high clay content, soil compaction, root disease, pesticide retention, climate, and soil fertility
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.

- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- The soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high content of clay of the subsoil, phytophthora root disease severely limits the production of Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to landscape plants.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.

Interpretive Group

Land capability classification: IIe

UsC—Unison loam, 8 to 15 percent slopes

Setting

Landscape: Mountain valleys of low mountains; dominantly in the areas of Shelton Laurel and Spring Creeks and in the intermountain hills and low mountains in the northwestern and southeastern parts of the county
Elevation range: 1,350 to 2,500 feet
Landform: Coves and high stream terraces
Landform position: Footslopes, toeslopes, and benches
Shape of areas: Irregular
Size of areas: As much as 56 acres

Composition

Unison soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 10 inches—dark yellowish brown loam

Subsoil:
10 to 49 inches—strong brown clay
49 to 80 inches—strong brown gravelly clay loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate

Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Moderate
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, which allows late spring and early fall frosts
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Old alluvium and colluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: High clay content subsoil; random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:

- Soils that are moderately eroded; in cropped fields
- Random areas of Tate soils that have less clay in the subsoil than the Unison soil
- Moderately well drained to poorly drained soils in depressions and on toeslopes
- Somewhat poorly drained French soils that are loamy in the upper part and have strata with a high content of rock fragments at a depth of 20 to 40 inches; along stream channels
- Urban land in and around the towns of Hot Springs and Mars Hill
- Udorthents, loamy, in and around the towns of Hot Springs and Mars Hill

Similar inclusions:

- Unison soils that have fine sandy loam, silt loam, and sandy clay loam surface textures

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Erodibility, equipment use, tilth, root penetration, pesticide retention, soil fertility, and climate
Management measures and considerations:

- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit equipment use in the steeper areas.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Chisel plowing and subsoiling helps to break through clay pans, which allows increased root penetration and rainfall infiltration.

- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Pasture and hayland

Suitability: Well suited
Management concerns: Equipment use, erodibility, root penetration, pesticide retention, and soil fertility
Management measures and considerations:

- The slope may limit equipment use in the steeper areas when harvesting hay crops.
- Using perennial grasses and legumes helps to penetrate and break up the clayey root zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Orchards—well suited; ornamentals—suited
Management concerns: Erodibility, equipment use, root disease, climate, ball and burlap harvesting, pesticide retention, and soil fertility
Management measures and considerations:

- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit equipment use in the steeper areas.
- Due to the restricted movement of air and water caused by the high content of clay of the subsoil, phytophthora root disease severely limits the production of Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent fracture or deformation of the ball and tearing of plant roots.

- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Woodland Management and Productivity

Potential for commercial species: High for cove hardwoods and eastern white pine
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:

- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not be grazed in areas managed for woodland.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Slope, erodibility, shrink-swell potential, high clay content, corrosivity, seeps and springs, and large stones
Management measures and considerations:

- Designing structures so that they conform with natural slopes helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- The soil is slippery and sticky when wet and slow to dry.
- Reinforcing foundations and footings or backfilling with coarse textured material helps to strengthen buildings and prevents the damage caused by shrinking and swelling.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Excavations may unearth large stones and boulders.

Septic tank absorption fields

Suitability: Suited

Management concerns: Restricted permeability, high clay content, slope, seeps and springs, and large stones

Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Excavations may unearth large stones and boulders.

Local roads and streets

Suitability: Suited

Management concerns: Low strength, high clay content, slope, erodibility, frost action, and seeps and springs

Management measures and considerations:
- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.
- Using a nondegradeable permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- The soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases soil strength, allows for year-round use, and helps to reduce the damage from frost heave.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.

Lawns and landscaping

Suitability: Suited

Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, climate, and soil fertility

Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- The soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high content of clay of the subsoil, phytophthora root disease severely limits the production of Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high

content of clay. The concentration of pesticides may be damaging to landscape plants.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.

Interpretive Group

Land capability classification: IIIe

UsD—Unison loam, 15 to 30 percent slopes

Setting

Landscape: Mountain valleys of low mountains; dominantly in areas of Shelton Laurel and Spring Creeks and in intermountain hills and low mountains in the northwestern and southeastern parts of the county
Elevation range: 1,350 to 2,500 feet
Landform: Coves and high stream terraces
Landform position: Footslopes, toeslopes, and benches
Shape of areas: Irregular
Size of areas: As much as 19 acres

Composition

Unison soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 10 inches—dark yellowish brown loam

Subsoil:
10 to 49 inches—strong brown clay
49 to 80 inches—strong brown gravelly clay loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Moderate
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate

Special climatic conditions: Soil subject to slow air drainage, which allows late spring and early fall frosts
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Old alluvium and colluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: High clay content in subsoil; random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Unison soils that are moderately eroded; in cropped fields
- Random areas of Tate soils that have less clay in the subsoil than the Unison soil
- Moderately well drained to poorly drained soils in depressions and on toeslopes
- Urban land in and around the towns of Hot Springs and Mars Hill
- Udorthents, loamy, in and around the towns of Hot Springs and Mars Hill

Similar inclusions:
- Unison soils that have fine sandy loam, silt loam, and sandy clay loam surface textures

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Equipment use, erodibility, tilth, root penetration, pesticide retention, soil fertility, and climate
Management measures and considerations:
- This soil is difficult to manage for cultivated crops because the slope limits equipment use.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Chisel plowing and subsoiling helps to break through clay pans, which allows increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.

Pasture and hayland

Suitability: Suited
Management concerns: Equipment use, erodibility, root penetration, pesticide retention, and soil fertility
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Suited
Management concerns: Equipment use, erodibility, root disease, climate, ball and burlap harvesting, pesticide retention, and soil fertility
Management measures and considerations:
- This soil is difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Due to the restricted movement of air and water caused by the high content of clay of the subsoil, phytophthora root disease severely limits the production of Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent fracture or deformation of the ball and tearing of plant roots.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the high content of clay, may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Woodland Management and Productivity

Potential for commercial species: High for cove hardwoods and eastern white pine
Suitability: Suited

Management concerns: Erodibility and equipment use
Management measures and considerations:
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not be grazed in areas managed for woodland.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, shrink-swell potential, high clay content, corrosivity, seeps and springs, and large stones
Management measures and considerations:
- Designing structures so that they conform with natural slopes helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- The soil is slippery and sticky when wet and slow to dry.
- Reinforcing foundations and footings or backfilling with coarse textured material helps to strengthen buildings and prevents the damage caused by shrinking and swelling.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Excavations may unearth large stones and boulders.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope, restricted permeability, high clay content, seeps and springs, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores, which may occur during the excavation of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Excavations may unearth large stones and boulders.

Local roads and streets

Suitability: Poorly suited
Management concerns: Low strength, high clay content, slope, erodibility, frost action, and seeps and springs
Management measures and considerations:

- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.
- Using a nondegradeable permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- The soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases soil strength, allows year-round use, and helps to reduce the damage from frost heave.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, climate, and soil fertility
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes can be difficult.
- The soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high content of clay of the subsoil, phytophthora root disease severely limits the production of Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of clay. The concentration of pesticides may be damaging to landscape plants.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.

Interpretive Group

Land capability classification: IVe

W—Water

This map unit includes rivers and larger streams, impoundments such as ponds and lakes, and borrow pits filled with water after operations have ceased. Elevation ranges from 1,200 to 4,250 feet. Areas are as much as 1,509 acres in size.

No interpretive groups are assigned to this map unit.

WaC2—Walnut-Oteen-Mars Hill complex, 8 to 15 percent slopes, moderately eroded

Setting

Landscape: Low and intermediate mountains; dominantly in the south-central and southeastern parts of the county
Elevation range: 1,600 to 3,500 feet
Landform: Ridges
Landform position: Summits
Shape of areas: Long and narrow or irregular
Size of areas: As much as 6 acres

Composition

Walnut soil and similar inclusions: 40 percent
Oteen soil and similar inclusions: 35 percent
Mars Hill soil and similar inclusions: 20 percent
Dissimilar inclusions: 5 percent

Typical Profile

Walnut

Surface layer:
0 to 2 inches—brown fine sandy loam

Subsoil:
2 to 21 inches—strong brown loam
21 to 27 inches—strong brown gravelly fine sandy loam

Bedrock:
27 to 80 inches—weathered, migmatitic gneiss bedrock

Oteen

Surface layer:
0 to 2 inches—dark brown fine sandy loam

Subsoil:
2 to 11 inches—dark yellowish brown fine sandy loam

Underlying material:
11 to 15 inches—dark yellowish brown very gravelly sandy loam saprolite

Bedrock:
15 to 80 inches—weathered, migmatitic gneiss bedrock

Mars Hill

Surface layer:
0 to 3 inches—dark yellowish brown fine sandy loam

Subsoil:
3 to 35 inches—dark yellowish brown fine sandy loam

Underlying material:
35 to 46 inches—dark yellowish brown fine sandy loam saprolite

Bedrock:
46 to 80 inches—weathered, migmatitic gneiss bedrock

Soil Properties and Qualities

Depth class: Walnut—moderately deep; Oteen—shallow; Mars Hill—deep
Drainage class: Walnut and Mars Hill—well drained; Oteen—somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Walnut—low; Oteen—very low; Mars Hill—moderate;
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Moderate; about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid to neutral throughout the profile
Parent material: Residuum weathered from felsic or mafic, high-grade metamorphic or igneous rock
Depth to bedrock: Walnut—20 to 40 inches to soft bedrock; Oteen—10 to 20 inches to soft bedrock; Mars Hill—40 to 60 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Random areas of soils that have more mica in the subsoil than the Walnut, Oteen, and Mars Hill soils and have soft bedrock at a depth of 10 to more than 60 inches
- Cowee and Evard soils that have more clay in the subsoil than the Walnut, Oteen, and Mars Hill soils and have soft bedrock at a depth of 20 to more than 60 inches; on shoulder slopes and nose slopes
- Tate soils that have thicker surface layers with more organic matter, have more clay in the subsoil, and have bedrock at a depth of more than 60 inches; in saddles and gaps
- Random areas of soils that are similar to Clifton soils but that have soft bedrock at a depth of less than 60 inches
- Widely scattered areas of rock outcrop on narrow ridges
- Random areas of soils that have soft bedrock at a depth of 1 to 10 inches
- Random areas of soils on slopes of less than 8 percent or more than 15 percent

Similar inclusions:
- Walnut, Oteen, and Mars Hill soils that have sandy loam and loam surface textures

Land Use

Dominant Uses: Pasture, hayland, and building site development
Other Uses: Cropland, woodland, wildlife habitat, and recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Walnut and Oteen—erodibility, equipment use, soil fertility, rooting depth, and droughtiness; Mars Hill—erodibility, equipment use, soil fertility, and rooting depth
Management measures and considerations:

- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- The slope limits equipment use in the steeper areas.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep and shallow rooting depth, the Walnut and Oteen soils are difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for the production of orchard and ornamental crops due to the moderately deep and shallow rooting depth of the Walnut and Oteen soils. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderate or moderately high for eastern white pine
Suitability: Poorly suited
Management concerns: Walnut and Oteen—equipment use, erodibility, and windthrow hazard; Mars Hill—equipment use and erodibility
Management measures and considerations:

- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Walnut and Oteen soils because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, slippage, erodibility, depth to bedrock, and frost action
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Walnut and Oteen—slope, erodibility, droughtiness, soil fertility, depth to bedrock, and droughtiness; Mars Hill—slope, erodibility, droughtiness, soil fertility, and depth to bedrock
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.

- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep and shallow rooting depth, the Walnut and Oteen soils are difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock needs to be removed.

Interpretive Group

Land capability classification: Walnut and Oteen—IVe; Mars Hill—IIIe

WaD2—Walnut-Oteen-Mars Hill complex, 15 to 30 percent slopes, moderately eroded

Setting

Landscape: Low and intermediate mountains; dominantly in the south-central and southeastern parts of the county
Elevation range: 1,600 to 3,500 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow or irregular
Size of areas: As much as 113 acres

Composition

Walnut soil and similar inclusions: 40 percent
Oteen soil and similar inclusions: 35 percent
Mars Hill soil and similar inclusions: 20 percent
Dissimilar inclusions: 5 percent

Typical Profile

Walnut

Surface layer:
0 to 2 inches—brown fine sandy loam

Subsoil:
2 to 21 inches—strong brown loam
21 to 27 inches—strong brown gravelly fine sandy loam

Bedrock:
27 to 80 inches—weathered, migmatitic gneiss bedrock

Oteen

Surface layer:
0 to 2 inches—dark brown fine sandy loam

Subsoil:
2 to 11 inches—dark yellowish brown fine sandy loam

Underlying material:
11 to 15 inches—dark yellowish brown very gravelly sandy loam saprolite

Bedrock:
15 to 80 inches—weathered, migmatitic gneiss bedrock

Mars Hill

Surface layer:
0 to 3 inches—dark yellowish brown fine sandy loam

Subsoil:
3 to 35 inches—dark yellowish brown fine sandy loam

Underlying material:
35 to 46 inches—dark yellowish brown fine sandy loam saprolite

Bedrock:
46 to 80 inches—weathered, migmatitic gneiss bedrock

Soil Properties and Qualities

Depth class: Walnut—moderately deep; Oteen—shallow; Mars Hill—deep
Drainage class: Walnut and Mars Hill—well drained; Oteen—somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Walnut—low; Oteen—very low; Mars Hill—moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Moderate; about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid to neutral throughout the profile
Parent material: Residuum weathered from felsic or mafic, high-grade metamorphic or igneous rock
Depth to bedrock: Walnut—20 to 40 inches to soft bedrock; Oteen—10 to 20 inches to soft bedrock; Mars Hill—40 to 60 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Random areas of soils that have more mica in the subsoil than the Walnut, Oteen, and Mars Hill soils and have soft bedrock at a depth of 10 to more than 60 inches
- Cowee and Evard soils that have more clay in the subsoil than the Walnut, Oteen, and Mars Hill soils and have soft bedrock at a depth of 20 to more than 60 inches; on shoulder slopes and nose slopes
- Tate soils that have thicker surface layers with more organic matter, have more clay in the subsoil, and have bedrock at a depth of more than 60 inches; in saddles and gaps
- Random areas of soils that are similar to Clifton soils but have soft bedrock at a depth of less than 60 inches
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of soils that have soft bedrock at a depth of 1 to 10 inches
- Widely scattered areas of rock outcrop on narrow ridges
- Random areas of soils on slopes of less than 15 percent or more than 30 percent

Similar inclusions:

- Walnut, Oteen, and Mars Hill soils that have sandy loam and loam surface textures

Land Use

Dominant Uses: Pasture, hayland, and building site development,
Other Uses: Cropland, woodland, wildlife habitat, and recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Walnut and Mars Hill—equipment use, erodibility, soil fertility, and rooting depth, and droughtiness; Oteen—equipment use, erodibility, soil fertility, and rooting depth
Management measures and considerations:

- The slope limits equipment use in the steeper areas.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep and shallow rooting depth, the Walnut and Oteen soils are difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for the production of orchard and ornamental crops due to the moderately deep and shallow rooting depth of the Walnut and Oteen soils. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderate or moderately high for eastern white pine
Suitability: Poorly suited
Management concerns: Walnut and Oteen—equipment use, erodibility, and windthrow hazard; Mars Hill—equipment use and erodibility
Management measures and considerations:

- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.

- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Walnut and Oteen soils because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, slippage, erodibility, depth to bedrock, and frost action
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.

Lawns and landscaping

Suitability: Poorly suited

Management concerns: Walnut and Oteen—slope, erodibility, soil fertility, depth to bedrock, and droughtiness; Mars Hill—slope, erodibility, soil fertility, and depth to bedrock

Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep and shallow rooting depth, the Walnut and Oteen soils are difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock needs to be removed.

Interpretive Group

Land capability classification: Walnut and Mars Hill—IVe; Oteen—VIe

WaE2—Walnut-Oteen-Mars Hill complex, 30 to 50 percent slopes, moderately eroded

Setting

Landscape: Low and intermediate mountains; dominantly in the south-central and southeastern parts of the county
Elevation range: 1,600 to 3,500 feet
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: As much as 345 acres

Composition

Walnut soil and similar inclusions: 40 percent
Oteen soil and similar inclusions: 35 percent
Mars Hill soil and similar inclusions: 20 percent
Dissimilar inclusions: 5 percent

Typical Profile

Walnut

Surface layer:
0 to 2 inches—brown fine sandy loam

Subsoil:
2 to 21 inches—strong brown loam
21 to 27 inches—strong brown gravelly fine sandy loam

Bedrock:
27 to 80 inches—weathered, migmatitic gneiss bedrock

Oteen

Surface layer:
0 to 2 inches—dark brown fine sandy loam

Subsoil:
2 to 11 inches—dark yellowish brown fine sandy loam

Underlying material:
11 to 15 inches—dark yellowish brown very gravelly sandy loam saprolite

Bedrock:
15 to 80 inches—weathered, migmatitic gneiss bedrock

Mars Hill

Surface layer:
0 to 3 inches—dark yellowish brown fine sandy loam

Subsoil:
3 to 35 inches—dark yellowish brown fine sandy loam

Underlying material:
35 to 46 inches—dark yellowish brown fine sandy loam saprolite

Bedrock:
46 to 80 inches—weathered, migmatitic gneiss bedrock

Soil Properties and Qualities

Depth class: Walnut—moderately deep; Oteen—shallow; Mars Hill—deep
Drainage class: Walnut and Mars Hill—well drained; Oteen—somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Walnut—low; Oteen—very low; Mars Hill—moderate;
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Moderate; about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid to neutral throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic, high-grade metamorphic or igneous rock
Depth to bedrock: Walnut—20 to 40 inches to soft bedrock; Oteen—10 to 20 inches to soft bedrock; Mars Hill—40 to 60 inches to soft bedrock

Minor Components

Dissimilar inclusions:

- Random areas of soils that have more mica in the subsoil than the Walnut, Oteen, and Mars Hill soils and have soft bedrock at a depth of 10 to more than 60 inches
- Cowee and Evard soils that have more clay in the subsoil than the Walnut, Oteen, and Mars Hill soils and have soft bedrock at a depth of 20 to more than 60 inches; on shoulder slopes and nose slopes
- Tate and Tusquitee soils that have thicker surface layers with more organic matter

and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Widely scattered areas of rock outcrop on narrow ridges and side slopes
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of soils that have soft bedrock at a depth of 1 to 10 inches
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways, below rock outcrops, and on benches and toeslopes
- Random areas of soils on slopes of less than 30 percent or more than 50 percent

Similar inclusions:
- Walnut, Oteen, and Mars Hill soils that have sandy loam and loam surface textures

Land Use

Dominant Uses: Pasture, woodland, and wildlife habitat
Other Uses: Building site development and recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management concerns: Walnut and Oteen—equipment use, erodibility, soil fertility, rooting depth, and droughtiness; Mars Hill—equipment use, erodibility, soil fertility, and rooting depth
Management measures and considerations:
- Because of the slope, this map unit is difficult to manage for pasture or hayland.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep and shallow rooting depth, the Walnut and Oteen soils are difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for the production of orchard and ornamental crops due to the slope and the moderately deep and shallow rooting depth of the Walnut and Oteen soils. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderate or moderately high for eastern white pine

Suitability: Poorly suited
Management concerns: Walnut and Oteen—equipment use, erodibility, and windthrow hazard; Mars Hill—equipment use and erodibility
Management measures and considerations:

- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.
- Productivity is limited in areas of the Walnut and Oteen soils because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:

- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for septic tanks because of the slope and depth to bedrock. A site should be selected on better suited soils.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, slippage, erodibility, depth to bedrock, and frost action
Management measures and considerations:

- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.

- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, helps to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible helps to prevent slippage and excessive soil erosion.
- Because of the droughty nature of the soils, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material allows year-round use and helps to reduce the damage from frost heave.
- The soft bedrock underlying these soils is not difficult to excavate but is difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Walnut and Oteen—slope, erodibility, soil fertility, depth to bedrock, and droughtiness; Mars Hill—slope, erodibility, soil fertility, and depth to bedrock
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep and shallow rooting depth, the Walnut and Oteen soils are difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock needs to be removed.

Interpretive Group

Land capability classification: VIIe

WoF—Walnut-Oteen-Rock outcrop complex, 50 to 95 percent slopes

Setting

Landscape: Low and intermediate mountains; dominantly in the south-central and southeastern parts of the county
Elevation range: 1,600 to 3,500 feet
Landform: Mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: As much as 431 acres

Composition

Walnut soil and similar inclusions: 40 percent
Oteen soil and similar inclusions: 35 percent
Rock outcrop: 20 percent
Dissimilar inclusions: 5 percent

Typical Profile

Walnut

Surface layer:
0 to 3 inches—brown fine sandy loam
3 to 9 inches—dark yellowish brown fine sandy loam

Subsoil:
9 to 21 inches—strong brown loam
21 to 27 inches—strong brown very gravelly fine sandy loam

Bedrock:
27 to 80 inches—weathered, migmatitic gneiss bedrock

Oteen

Surface layer:
0 to 2 inches—dark brown fine sandy loam

Subsoil:
2 to 11 inches—dark yellowish brown fine sandy loam

Underlying material:
11 to 15 inches—dark yellowish brown very gravelly sandy loam saprolite

Bedrock:
15 to 80 inches—weathered, migmatitic gneiss bedrock

Rock outcrop

This part of the map unit consists of outcrops of predominantly migmatitic gneiss bedrock.

Properties and Qualities of the Walnut and Oteen Soils

Depth class: Walnut—moderately deep; Oteen—shallow
Drainage class: Walnut—well drained; Oteen—somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Walnut—low; Oteen—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Walnut—medium; Oteen—high
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Very strongly acid to neutral throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Walnut—20 to 40 inches to soft bedrock; Oteen—10 to 20 inches to soft bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Random areas of Mars Hill soils that have soft bedrock at a depth of 40 to 60 inches
- Random areas of soils that have more mica in the subsoil than the Walnut and Oteen soils and have soft bedrock at a depth of 10 to more than 60 inches
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways, below rock outcrops, and on benches and toeslopes
- Tate and Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Cowee soils that have more clay in the subsoil than the Walnut and Oteen soils and have soft bedrock at a depth of 20 to 40 inches; on shoulder slopes and nose slopes
- Soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Random areas of soils that have soft bedrock at a depth of 1 to 10 inches
- Random areas of soils on slopes of less than 50 percent or more than 95 percent

Similar inclusions:
- Walnut and Oteen soils that have sandy loam and loam surface textures

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for pasture and hay production because of the slope, erodibility, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of the slope,

erodibility, low productivity, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tanks because of the slope, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: Walnut and Oteen—VIIe; Rock outcrop—VIIIs

WrC—Wayah-Burton complex, windswept, 8 to 15 percent slopes, bouldery

Setting

Landscape: High mountains on Max Patch Mountain
Elevation range: 4,550 to 4,650 feet
Landform: Ridges
Landform position: Summits
Shape of areas: Long and narrow or irregular
Size of areas: 10 acres

Composition

Wayah soil and similar inclusions: 50 percent
Burton soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Wayah

Surface layer:
0 to 14 inches—very dark brown loam

Subsoil:
14 to 48 inches—yellowish brown sandy loam

Underlying material:
48 to 80 inches—brown gravelly sandy loam saprolite

Burton

Surface layer:
0 to 15 inches—very dark brown sandy clay loam

Subsoil:
15 to 24 inches—dark yellowish brown sandy loam

Bedrock:
24 to 80 inches—unweathered, hard Max Patch granite

Soil Properties and Qualities

Depth class: Wayah—very deep; Burton—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Wayah—moderate; Burton—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Rock fragments on the surface: Widely scattered surface stones and boulders that average about 10 to 48 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and frequent rime ice in winter, high winds, and a short growing season
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum weathered from felsic igneous rock
Depth to bedrock: Wayah—more than 60 inches; Burton—20 to 40 inches to hard bedrock
Other distinctive properties: Random areas of seeps and springs; water movement along bedrock contacts in the Burton soil

Minor Components

Dissimilar inclusions:

- Soils that have hard bedrock at a depth of 10 to 20 inches; adjacent to rock outcrops
- Widely scattered areas of rock outcrop
- Soils that have loamy subsoils and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and in saddles and gaps
- Random areas of soils on slopes of less than 8 percent or more than 15 percent

Similar inclusions:
- Wayah soils that have fine sandy loam and sandy loam surface textures
- Burton soils that have coarse sandy loam, fine sandy loam, and loam surface textures
- Random areas of similar soils that have bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Pasture, recreation, and wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, damaging high winds, and short growing season. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Wayah—equipment use, erodibility, climate, pesticide retention, soil fertility, and rooting depth; Burton—equipment use, erodibility, climate, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- This map unit is limited for pasture and hayland because of the slope, erodibility, the bouldery surface, damaging high winds, and short growing season.
- The slope may limit equipment use in the steeper areas when harvesting hay crops.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Burton soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of damaging high winds, short growing season, depth to bedrock, and droughtiness of the Burton soil. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of damaging high

winds, short growing season, and depth to bedrock for the Burton soil. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Wayah—slope, erodibility, climate, and corrosivity; Burton—slope, erodibility, climate, corrosivity, and depth to bedrock
Management measures and considerations:

- Designing structures so that they conform with natural slopes helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Design modifications are needed to overcome the limitation of prolonged freezing temperatures and damaging high winds.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Drilling and blasting of rock or special earthmoving equipment is needed to increase the depth of the Burton soil.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Wayah—slope and climate; Burton—slope, climate, and depth to bedrock
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Design modifications are needed to overcome the limitation of extreme freezing temperatures.
- Locating and using areas of the deeper Wayah soils may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Wayah—slope, erodibility, and frost action; Burton—slope, erodibility, frost action, and depth to bedrock
Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows year-round use and helps to reduce the damage from frost heave.
- Blasting or special grading equipment is needed to construct roads in areas of the Burton soil.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Wayah—slope, erodibility, climate, pesticide retention, soil

fertility, and depth to bedrock; Burton—slope, erodibility, climate, pesticide retention, soil fertility, depth to bedrock, and droughtiness

Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Due to a short growing season, the use of native, winter-hardy landscape plants is recommended.
- This map unit is subject to damaging high winds and may be unsuitable for some types of landscaping.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- Areas where water concentrates are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Burton soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Group

Land capability classification: VIc

WrD—Wayah-Burton complex, windswept, 15 to 30 percent slopes, bouldery

Setting

Landscape: High mountains on Max Patch Mountain
Elevation range: 4,500 to 4,600 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow or irregular
Size of areas: 12 acres

Composition

Wayah soil and similar inclusions: 50 percent
Burton soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Wayah

Surface layer:
0 to 14 inches—very dark brown loam

Subsoil:
14 to 48 inches—yellowish brown sandy loam

Underlying material:
48 to 80 inches—brown gravelly sandy loam saprolite

Burton

Surface layer:
0 to 17 inches—very dark brown sandy clay loam

Subsoil:
17 to 29 inches—dark yellowish brown sandy loam

Bedrock:
29 to 80 inches—unweathered, hard Max Patch granite

Soil Properties and Qualities

Depth class: Wayah—very deep; Burton—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Wayah—moderate; Burton—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface stones and boulders that average about 10 to 48 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and frequent rime ice in winter and high winds and a short growing season
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum weathered from felsic igneous rock
Depth to bedrock: Wayah—more than 60 inches; Burton—20 to 40 inches to hard bedrock
Other distinctive properties: Random areas of seeps and springs; water movement along bedrock contacts in the Burton soil

Minor Components

Dissimilar inclusions:
- Soils that have hard bedrock at a depth of 10 to 20 inches; adjacent to rock outcrops
- Widely scattered areas of rock outcrop
- Soils that have loamy subsoils and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and in saddles and gaps
- Random areas of soils on slopes of less than 15 percent or more than 30 percent

Similar inclusions:
- Wayah soils that have fine sandy loam and sandy loam surface textures
- Burton soils that have coarse sandy loam, fine sandy loam, and loam surface textures
- Random areas of soils that are similar to the Wayah and Burton soils but that have bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Wildlife habitat and recreation
Other Uses: Pasture

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for crop production because of the slope, erodibility, damaging high winds, and short growing season. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Wayah—equipment use, erodibility, climate, pesticide retention, soil fertility, and rooting depth; Burton—equipment use, erodibility, climate, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:

- This map unit is limited for pasture and hayland because of the slope, erodibility, the bouldery surface, damaging high winds, and short growing season.
- The slope limits equipment use in the steeper areas.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and moderately deep rooting depth, the Burton soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for orchard and ornamental crops because of damaging high winds, short growing season, depth to bedrock, and droughtiness in the Burton soil. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:

- This map unit is severely limited for timber production because of damaging high winds, short growing season, low productivity, and depth to bedrock in the Burton soil. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Wayah—slope, erodibility, climate, and corrosivity; Burton—slope, erodibility, climate, corrosivity, and depth to bedrock

Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Design modifications are needed to overcome the limitation of prolonged freezing temperatures.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Drilling and blasting of rock or special earthmoving equipment is needed to increase the depth of the Burton soil.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Wayah—slope, climate, and prolonged freezing temperatures; Burton—slope, climate, prolonged freezing temperatures, and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Design modifications are needed to overcome the limitation of prolonged freezing temperatures.
- Locating and using areas of the deeper Wayah soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Wayah—slope, erodibility, and frost action; Burton—slope, erodibility, frost action, and depth to bedrock
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, helps to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible helps to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- Blasting or special grading equipment is needed to construct roads in areas of the Burton soil.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Wayah—slope, erodibility, climate, pesticide retention, soil fertility, and depth to bedrock; Burton—slope, erodibility, climate, pesticide retention, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Due to a short growing season, the use of native, winter-hardy landscape plants is recommended.
- This map unit is subject to damaging high winds and may be unsuitable for some types of landscaping.

- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Burton soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Group

Land capability classification: VIc

WrE—Wayah-Burton complex, windswept, 30 to 50 percent slopes, bouldery

Setting

Landscape: High mountains on Max Patch Mountain
Elevation range: 4,400 to 4,600 feet
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Shape of areas: Irregular
Size of areas: 14 acres

Composition

Wayah soil and similar inclusions: 50 percent
Burton soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Wayah

Surface layer:
0 to 14 inches—very dark brown loam

Subsoil:
14 to 48 inches—yellowish brown sandy loam

Underlying material:
48 to 80 inches—brown gravelly sandy loam saprolite

Burton

Surface layer:
0 to 17 inches—very dark brown sandy clay loam

Subsoil:
17 to 29 inches—dark yellowish brown sandy loam

Bedrock:
29 to 80 inches—unweathered, hard Max Patch granite

Soil Properties and Qualities

Depth class: Wayah—very deep; Burton—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Wayah—moderate; Burton—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface stones and boulders that average about 10 to 48 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and frequent rime ice in winter; high winds and a short growing season
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic igneous rock
Depth to bedrock: Wayah—more than 60 inches; Burton—20 to 40 inches to hard bedrock
Other distinctive properties: Random areas of seeps and springs; Burton—water movement along bedrock contacts

Minor Components

Dissimilar inclusions:
- Soils that have hard bedrock at a depth of 10 to 20 inches; adjacent to rock outcrops
- Widely scattered areas of rock outcrop
- Soils that have more rock fragments in the subsoil than the Wayah and Burton soils; below rock outcrops and in drainageways
- Soils that have loamy subsoils and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains, in drainageways, and on benches and footslopes
- Random areas of soils on slopes of less than 30 percent or more than 50 percent

Similar inclusions:
- Wayah soils that have fine sandy loam and sandy loam surface textures
- Burton soils that have coarse sandy loam, fine sandy loam, and loam surface textures
- Random areas of soils that are similar to the Wayah and Burton soils but that have bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Wildlife habitat and recreation

Agricultural Development

Cropland

Suitability: Unsuited

Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, damaging high winds, and short growing season. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Pasture—poorly suited; hayland—unsuited
Management concerns: Wayah—equipment use, erodibility, climate, pesticide retention, soil fertility, and rooting depth; Burton—equipment use, erodibility, climate, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- This map unit is severely limited for pasture and hayland because of the slope, erodibility, the bouldery surface, damaging high winds, and the short growing season.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity and the moderately deep rooting depth, the Burton soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, damaging high winds, short growing season, and depth to bedrock, and droughtiness in areas of the Burton soil. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of damaging high winds, short growing season, low productivity, and depth to bedrock in the Burton soil. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Wayah—slope, erodibility, climate, and corrosivity; Burton—slope, erodibility, climate, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control

structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Design modifications are needed to overcome the limitation of prolonged freezing temperatures and high winds.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Drilling and blasting of rock or special earthmoving equipment is needed to increase the depth of the Burton soil.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Wayah—slope, climate, and prolonged freezing temperatures; Burton—slope, climate, prolonged freezing temperatures, and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Design modifications are needed to overcome the limitation of prolonged freezing temperatures.
- Locating and using areas of the deeper Wayah soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Wayah—slope, erodibility, and frost action; Burton—slope, erodibility, frost action, and depth to bedrock
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heave.
- Blasting or special grading equipment is needed to construct roads in areas of the Burton soil.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Wayah—slope, erodibility, climate, pesticide retention, soil fertility, and depth to bedrock; Burton—slope, erodibility, climate, pesticide retention, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration. Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Due to a short growing season, the use of native, winter-hardy landscape plants is recommended.
- This map unit is subject to damaging high winds and may be unsuitable for some types of landscaping.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to landscape plants. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.

- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Burton soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Group

Land capability classification: VIIe

WsF—Wayah-Burton complex, windswept, 50 to 95 percent slopes, very rocky

Setting

Landscape: High mountains on Max Patch Mountain
Elevation range: 4,400 to 4,600 feet
Landform: Mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: 7 acres

Composition

Wayah soil and similar inclusions: 60 percent
Burton soil and similar inclusions: 30 percent
Dissimilar inclusions: 10 percent

Typical Profile

Wayah

Surface layer:
0 to 14 inches—very dark brown loam

Subsoil:
14 to 48 inches—yellowish brown sandy loam

Underlying material:
48 to 80 inches—brown gravelly sandy loam saprolite

Burton

Surface layer:
0 to 17 inches—very dark brown sandy clay loam

Subsoil:
17 to 29 inches—dark yellowish brown sandy loam

Bedrock:
29 to 80 inches—unweathered, hard Max Patch granite

Soil Properties and Qualities

Depth class: Wayah—very deep; Burton—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid

Available water capacity: Wayah—moderate; Burton—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Medium
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface stones and boulders that average about 10 to 48 inches in diameter and 25 to 75 feet apart
Extent of rock outcrop: About 7 percent on the soil surface
Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and frequent rime ice in winter; high winds and a short growing season
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic igneous rock
Depth to bedrock: Wayah—more than 60 inches; Burton—20 to 40 inches to hard bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material; water movement along bedrock contacts in the Burton soil

Minor Components

Dissimilar inclusions:
- Soils that have hard bedrock at a depth of 10 to 20 inches; adjacent to rock outcrops
- Soils that have more rock fragments in the subsoil than the Wayah and Burton soils; below rock outcrops and in drainageways
- Soils that have loamy subsoils and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains, in drainageways, and on benches and footslopes
- Random areas of soils on slopes of less than 50 percent or more than 95 percent

Similar inclusions:
- Wayah soils that have fine sandy loam and sandy loam surface textures
- Burton soils that have coarse sandy loam, fine sandy loam, and loam surface textures
- Random areas of soils that are similar to the Wayah and Burton soils but that have bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, damaging high winds, short growing season, and the extent of rock outcrops. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, damaging high winds, short growing season, and the extent of rock outcrops. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, damaging high winds, short growing season, erodibility, and the extent of rock outcrops. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for timber production because of damaging high winds, short growing season, low productivity, and depth to bedrock in the Burton soil. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for dwellings because of the slope, erodibility, damaging high winds, prolonged freezing temperatures, depth to bedrock in the Burton soil, and the extent of rock outcrops. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for septic tank absorption fields because of the slope, prolonged freezing temperatures, depth to bedrock in the Burton soil, and the extent of rock outcrops. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock in the Burton soil, and the extent of rock outcrops. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, damaging high winds, short growing season, depth to bedrock in the Burton soil, and the extent of rock outcrops. A site should be selected on better suited soils.

Interpretive Group

Land capability classification: VIIe

WtB—Whiteside loam, 2 to 8 percent slopes

Setting

Landscape: Mountain valleys throughout the county
Elevation range: 2,000 to 4,000 feet
Landform: Colluvial fans
Landform position: Concave to planar toeslopes
Shape of areas: Long and narrow
Size of areas: As much as 17 acres

Composition

Whiteside soil and similar inclusions: 90 percent
Dissimilar inclusions: 10 percent

Typical Profile

Surface layer:
0 to 14 inches—very dark grayish brown loam

Subsoil:
14 to 47 inches—grayish brown sandy clay loam that has mottles in shades of red and brown

Underlying material:
47 to 53 inches—light brownish gray sandy loam
53 to 80 inches—gray sandy clay loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Moderately well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Moderate or high
Depth to seasonal high water table: 2.0 to 3.0 feet from December through May and 2.0 to 3.5 feet from June through November
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Slight; less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Moderate
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Colluvium and old alluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:

- Moderately well drained Dellwood and Reddies soils that are loamy in the upper part and that have strata with a high content of rock fragments at a depth of 8 to 40 inches; along stream channels
- Somewhat poorly drained French and poorly drained Ela soils that have subsoils that are loamy in the upper part and have strata with a high content of rock fragments at a depth of 20 to 40 inches; along stream channels, in depressions, and in backwater areas
- Soils that have surface layers with less organic matter; in cropped fields
- Very poorly drained Hemphill soils that have clayey subsoils; in depressions and backwater areas
- Areas that rarely flood for very brief duration; along stream channels
- Random areas of soils on slopes of less than 2 percent or more than 8 percent

Similar inclusions:

- Whiteside soils that have sandy loam, fine sandy loam, and sandy clay loam surface textures

Land Use

Dominant Uses: Hayland, pasture, and cropland
Other Uses: Recreation

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Erodibility, climate, tilth, pesticide retention, and soil fertility
Management measures and considerations:

- Using conservation practices, such as contour farming, winter cover crops, and crop rotations that include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, pesticide retention, and soil fertility
Management measures and considerations:

- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to reduce the hazard of soil erosion.
- Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
- This soil may retain soil-applied herbicides and other pesticides due to the high

content of organic matter of the surface layer. The concentration of pesticides may be damaging to future crops. Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Erodibility, climate, wetness, root disease, and soil fertility
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content of the subsoil of the Whiteside soil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease.
- Following lime and fertilizer recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and very high for eastern white pine
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:
- Designing roads on the contour; installing water-control structures, such as broad-based dips, water bars, and culverts; and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of organic matter in the surface layer, and the clay content of the subsoil of the Whiteside soil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be grazed in areas managed for woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Erodibility, wetness, and corrosivity
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for dwellings.
- This map unit is difficult to manage for dwellings due to a seasonal high water table at a depth of 2.0 to 3.0 feet.

- The risk of corrosion damage to uncoated steel and concrete is moderate or high.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Wetness and restricted permeability
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for septic tank absorption fields.
- This map unit is difficult to manage for septic tank absorption fields due to a seasonal high water table at a depth of 2.0 to 3.0 feet in areas of the Whiteside soil.

Local roads and streets

Suitability: Tusquitee—suited; Whiteside—poorly suited
Management concerns: Tusquitee and Whiteside—erodibility, seeps and springs, large stones, and wetness; Whiteside—erodibility, seeps and springs, large stones, wetness, and low soil strength
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability. Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- When the soil is wet, unsurfaced roads are highly erodible and very slick due the content of silt and clay in the subsoil of the Whiteside soil.
- Incorporating sand and gravel into the roadbed, compacting roadbeds, and designing roads that conform with natural slopes help to improve soil strength.
- Excavations may unearth large stones and boulders.

Lawns and landscaping

Suitability: Suited
Management concerns: Tusquitee—erodibility, climate, root disease, soil fertility, and wetness; Whiteside—erodibility, climate, root disease, soil fertility, wetness, and soil compaction
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration. Vegetating disturbed areas and using erosion-control structures such as sediment fences helps to keep eroding soil onsite.
- Because of slow air drainage and frost pockets, late spring frost may damage new growth in some years.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil from disturbed areas should be stockpiled and replaced before landscaping.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content of the subsoil of the Whiteside soil, phytophthora root disease is a potential limitation for Fraser fir and other ornamentals.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.

Interpretive Group

Land capability classification: IIe

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Generally, the soils in Madison County that are well suited to crops are also well suited to urban uses. The data concerning specific soils in the county can be used in planning future land use patterns. The potential for farming should be considered relative to any soil limitations and the potential for non-farm development.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Interpretive Ratings

The interpretive tables in this survey rate the soils in the survey area for various uses. Many of the tables identify the limitations that affect specified uses and indicate the severity of those limitations. The ratings in these tables are both verbal and numerical.

Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited by all of the soil features that affect a specified use or in terms that indicate the suitability of the soils for the use. Thus, the tables may show limitation classes or suitability classes. Terms for the limitation classes are *not limited, somewhat limited,* and *very limited*. The suitability ratings are expressed as *well suited, moderately suited, poorly suited,* and *unsuited* or as *good, fair,* and *poor*.

Numerical Ratings

Numerical ratings in the tables indicate the relative severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation. The limitations appear in order from the most limiting to the least limiting. Thus, if more than one limitation is identified, the most severe limitation is listed first and the least severe one is listed last.

Crops and Pasture

Russell Blevins, District Conservationist, Natural Resources Conservation Service; Ross Young, Madison County Chairman, North Carolina Cooperative Extension Service; and Bobby Brock, Agronomist, and Kelley Jo Driggins, Grassland Management Specialist, Natural Resources Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils are identified, the system of land capability classification used by the Natural Resources Conservation Service is explained, the estimated yields of the main crops and hay and pasture plants are listed for each soil, orchard and ornamental crops are discussed, and prime farmland is described.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading “Detailed Soil Map Units” and in the tables. Specific information can be obtained from the local office of the Natural Resources Conservation Service, the Cooperative Extension Service, or the Madison Soil and Water Conservation District.

Federal and State regulations require that any area designated as wetlands cannot be altered without prior approval. Contact the local office of the Natural Resources Conservation Service for identification of hydric soils and potential wetlands.

Cropland

In 2002, according to the North Carolina Cooperative Extension Service of Madison County, Madison County had approximately 2,115 acres of cropland.

The major crops grown in Madison County include burley tobacco, silage corn, vegetables, landscaping ornamentals, berries, and apples (fig. 5). Cultivated lands occur on nearly level bottomland soils and gently sloping to strongly sloping terrace soils along the major tributaries of Spring, California, and Crooked Creeks and lower portions of the French Broad River. Soils managed include Rosman, French, Dellwood, Reddies, Dillard, and Unison. Gently sloping to strongly sloping soils on intermountain hills and low mountains (such as Evard, Clifton, and Cowee soils) and on terraces and in coves (such as Unison and Tate soils) are farmed in the Mars Hill, Marshall, Spring Creek, California Creek, Paint Fork, and Trust communities. Other areas of cultivated land are scattered throughout the county.

Ornamental crops are grown throughout the county on intermediate and low mountains and intermountain hills (in areas of Porters, Evard, and Buladean soils), in coves and on terraces (in areas of Tate, Unison, and Tusquitee soils), and on flood plains (in areas of Rosman, French, Dellwood, and Reddies soils). The mountains and coves of the Shelton Laurel Creek valley are the major areas for growing ornamental crops.

A short discussion of several points relative to soil quality improvements follows. Enhanced soil quality can help to reduce the onsite and offsite costs of soil erosion, improve nutrient utilization, and ensure that the soil resource is sustained for future

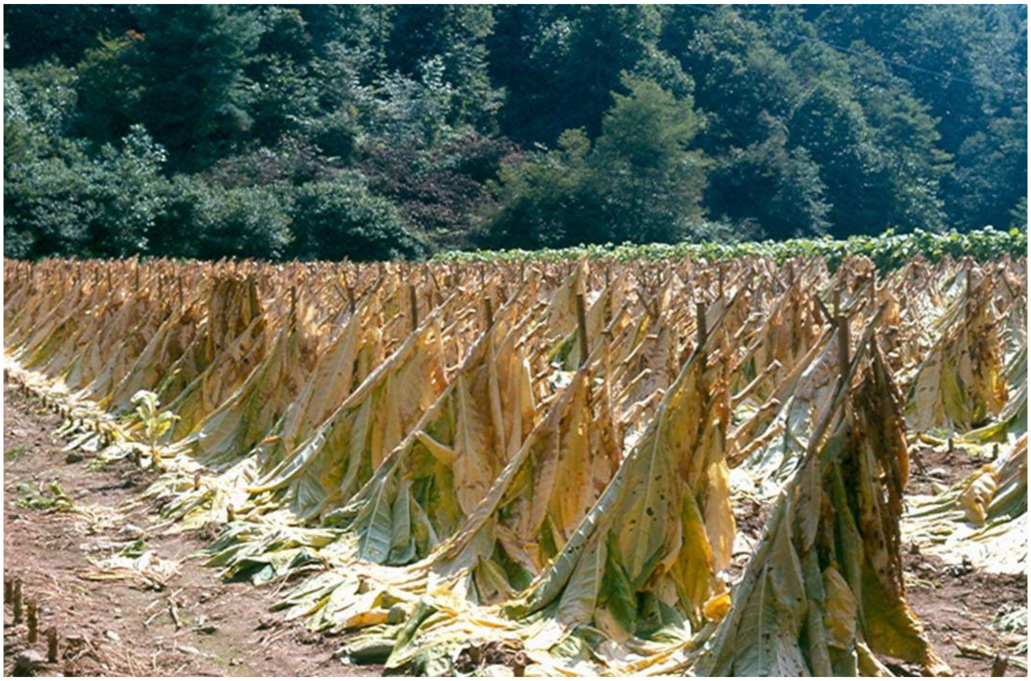

Figure 5.—Burley tobacco in an area of Rosman fine sandy loam, 0 to 3 percent slopes, occasionally flooded. This soil produces high crop yields.

use. The soil's physical, chemical, and biological properties must be at optimal levels for high yields to be maintained on a sustainable basis. More specific information can be obtained from the local office of the Natural Resources Conservation Service, the Madison Soil and Water Conservation District, or the North Carolina Cooperative Extension Service.

Erosion control.—Water erosion is a major concern on most of the soils used for cropland in Madison County. It is a hazard on soils that have slopes of more than 2 percent. Tate and Clifton soils are examples. As the slope increases, the hazard of erosion and the difficulty in controlling erosion also increase. Loss of the surface layer through erosion is damaging. Soil productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils that have a clayey subsoil, such as Clifton and Unison soils, and on soils that have a layer in or below the subsoil that limits the depth of the root zone, such as Cowee soils.

Erosion on farmland reduces soil productivity while the runoff pollutes streams, lakes, and reservoirs with sediment, agricultural chemicals, and nutrients. Controlling erosion improves the quality of water for municipal use, for recreation, and for fish and wildlife. Madison County's trout streams are especially sensitive to damage caused by runoff and sediment.

Erosion-control practices provide a protective surface cover, minimize runoff, and increase the rate of water infiltration. A cropping system that keeps a vegetative cover on the soil for extended periods helps to minimize soil loss and maintains the productive capacity of the soil. In sloping areas, including forage crops of grasses and legumes in the cropping system helps to control erosion. The forage crops also add nitrogen to the soil and improve tilth. Minimizing tillage and leaving crop residue on the surface increase the rate of water infiltration, reduce runoff, and help to control erosion. These practices can be effective on most of the soils in the survey area.

Other practices include terraces and diversions, which shorten the length of slopes and thus minimize erosion caused by runoff. Contour farming and stripcropping are also effective components of a resource management system. Stripcropping offers the use of crop rotation, crop residue management, contouring, and cover crops. These methods are practical as they can be adapted to a wide range of slope patterns. Information about erosion-control measures for each kind of soil is available at the local office of the Natural Resources Conservation Service.

Water management.—Soils on bottom lands and low terraces are subject to flooding at varying frequencies and durations. Ela soils are flooded frequently, (the chance of flooding is greater than 50 percent chance in any year). French, Rosman, Reddies, and Dellwood soils are flooded occasionally (the chance of flooding is 5 to 50 percent in any year). Dillard and Statler soils are rarely flooded (the chance of flooding is 0 to 5 percent in any year). Duration is very brief (less than 2 days). Regardless, the risk of crop loss due to flooding during the growing season is always a possibility on rarely flooded soils.

French soils are on bottom lands and may require artificial drainage. Subsurface drainage tile is used to control the water table in these soils. Wet areas due to seeps and springs occur in Dillard, Unison, Tate, Toecane, Tusquitee, Northcove, and Maymead soils. They are often located on the soil map with a “wet spot” symbol. Ela soils are poorly drained and are not recommended for cropland use. Federal and State regulations require that any area designated as wetlands cannot be altered without prior approval. Contact the local office of the Natural Resources Conservation Service for identification of hydric soils and potential wetlands.

Surface water management is important on cropland. Overland flow and runoff from adjacent land onto cultivated lands must be controlled. Surface water movement across plowed fields needs control as well. Grassed waterways and diversions are examples of measures that help to reduce surface water problems, such as soil erosion, and help to maintain water quality in adjacent waterways. Onsite investigations are essential to determine the proper method of control.

Soil tilth.—Soils with good tilth have good aeration, high water infiltration, a good water-holding capacity, and low seedling mortality rates. Soil properties associated with good tilth are loamy surface textures and a medium or high organic matter content in the surface layer. Soils in Madison County on slopes of less than 3 percent often have better tilth than areas on slopes of more than 4 percent. Steeper areas are more susceptible to erosion. This erosion results in surfaces layers with higher clay contents and lower organic matter contents, thus degrading tilth and overall soil quality.

Continuous cropping, lack of erosion control, excessive cultivation, and surface compaction by farm equipment lead to the depletion of organic matter, which adversely affects soil tilth. Periods of heavy rainfall result in the formation of a crust on the soil surface. The crust is hard when dry and nearly impervious to water. It reduces the rate of water infiltration and increases the runoff rate. Regular additions of crop residue, manure, and other organic material can improve soil structure and prevent the formation of a crust.

Resource management systems such as contour farming, conservation tillage, crop residue management, stripcropping, winter cover crops, and crop rotations which include grasses and legumes help to minimize soil erosion, clodding, and crusting. These practices also allow for increased rainfall infiltration, increased amounts of plant-available water, and improved soil fertility and soil tilth.

Because of crusting during winter and spring, fall plowing is generally not recommended. Many of the soils that are plowed in fall are almost as dense and hard at planting time as they were before they were plowed. More than 90 percent of the cropland in the survey area consists of sloping soils that are subject to erosion if they are plowed in fall. Severely eroded, clayey soils, such as Clifton soils, become cloddy if they are plowed outside a narrow range in moisture content. Fall plowing on these soils generally results in better tilth in spring. Some soils in the survey area have poor tilth because of gravel in the surface layer. These soils are in small, isolated areas along river bottoms and terraces. The content and size of the pebbles affect the use of tillage implements. Stones and boulders are common in many of the colluvial soils in the survey area, especially in Tusquitee, Toecane, and Maymead soils. In some places the rock fragments prevent tillage. In other places they can be removed.

Soil fertility.—The soils in Madison County are generally low in natural fertility, and most are naturally acidic. Mars Hill, Walnut, and Oteen soils are exceptions, having a pH ranging from 5.0 to 7.3 (very strongly acid to neutral). Soil amendments of lime, fertilizer, and organic matter are needed for most kinds of crop and pasture production.

Liming requirements are a major concern because the acidity level in the soil affects the availability of many of the nutrient elements to plants, the activity of beneficial bacteria, and the other components of the soil's biological community. Lime also neutralizes exchangeable aluminum. This counteracts the adverse effects of high levels of aluminum on many crops. Liming adds calcium (calcitic lime) or calcium and magnesium (dolomitic lime) to the soil. Incorporating lime into the soil before planting is important due to its slow movement into the root zone when applied on the surface.

A soil test is used as a guide to indicate how much and what kind of lime and fertilizer should be used. For example, in soils that have sandy surface layers, magnesium and available calcium levels may be low. Depending on the soil properties and the crop to be grown, the desired pH levels may differ. Soil tests are needed to determine proper application rates.

Soil tests also indicate the need for phosphorus and potassium fertilizer. This is important because while natural occurring phosphorus and potassium levels are commonly very low, land in long-term agricultural use typically has higher than expected levels of these nutrients. Phosphorous and potassium have a tendency to build up in the soil.

Nitrogen fertilizer is required for most crops. It is not, however, required for clover, in some rotations of soybeans, or for alfalfa that is established. Appropriate rates depend on the crop and the potential productivity of the soil.

For example, nitrogen rates for corn on soils that have a yield potential of 125 to 150 bushels per acre should be about 140 to 160 pounds per acre. Where the yield potential is only 100 bushels per acre, rates of about 100 to 120 pounds of nitrogen per acre should be used. Application of nitrogen in excess of potential yields is not recommended. The excess fertilizer not utilized by the crop creates an unnecessary expense and can result in surface and ground-water pollution.

Nitrogen can be readily leached from the more sandy soils, such as Biltmore, Rosman, Reddies, and Dellwood. As a result, split applications of nitrogen may be needed on these soils during the growing season.

Nitrogen rates can be reduced on fields using a continuous no-till system provided that organic matter levels have been increased substantially. This increase can be achieved with a minimum of 2 tons per acre of organic matter left on the surface annually in the absence of tillage. Farmer experience and research alike have shown sustained yields with reduced nitrogen rates.

Pest control.—Herbicides and other pesticides may be necessary for controlling weeds, harmful insects, and disease and should be applied by banding or spot treatment where possible. Label directions must be followed to control target organisms and minimize the contamination of soil, water, air, and nontarget organisms. Soil properties, such as organic matter content and clay content of the surface layer, affect the rate of soil-applied applications. Estimates for these properties were determined for the soils in this survey area. The thickness and texture of the soil layers are shown in the USDA texture column in table 17. Table 18 shows the general ranges of clay content and organic matter content in the surface layer.

In some areas, the organic matter content of a soil may be outside the range shown in table 18. The content may be higher in soils that have received high amounts of animal or manmade waste. Soils that have recently been brought into cultivation (pasture conversion) may have a higher organic matter content in the surface layer than similar soils that have been cultivated (cropland conversion). Lower levels of organic matter are common in soils where the surface layer has been partly or completely removed by erosion, land smoothing, or other activities, such as woodland clearing.

Soils such as Porters, Hemphill, Tusquitee, Whiteside, Dellwood, Reddies, and Rosman have enough organic matter in the surface layer to inhibit the activity of some soil-applied pesticides. Current soil tests should be used to measure the organic matter content before soil-applied rates are determined. Refer to the label of the pesticide container for further instructions. Eroded soils such as Clifton and Braddock may have enough clay in the surface layer to bind pesticides.

The wet conditions of Ela and French soils and areas with seeps and springs may reduce the effectiveness of pesticides and allow for the contamination of surface and ground water. Saturated soils and areas with excess surface water from prolonged rains or irrigation can carry herbicides and other pesticides to surface waters. The contamination of surface and ground water is also a concern in Biltmore, Rosman, Dellwood, and Reddies soils due to a high leaching rate caused by a low content of clay. Table 20 shows depth to water table and flooding frequency for soils in the survey area.

Erosion-control practices, such as permanent ground cover and grassed filter strips in drainageways and field borders, help to minimize soil loss and runoff that can carry absorbed or dissolved herbicides and other pesticides to surface waters. Utilizing weather forecasts and scheduling irrigation so it does not conflict with herbicide and pesticide use help to reduce contamination problems.

The pesticide product labels show specific application rates based on the organic matter and clay content of the soil. Refer to the “Detailed Soil Map Units” section for information on map unit composition, soil properties and behavior, and management concerns and considerations.

Integrated pest management programs avoid unnecessary pesticide applications. Crops are scouted to determine if pests are present and then monitored to determine when populations merit control in order to prevent economic loss. This allows for the timeliest use of the pesticide and thus the most cost-effective alternative.

Other methods of weed, pest, and disease control include the use of goats, biological agents, mulching, hand weeding, and mowing. These viable alternatives can be used alone or in combination with chemical control. The latest information on these types of control can be obtained at the local office of the North Carolina Cooperative Extension Service, the Madison Soil and Water Conservation District, or the Natural Resources Conservation Service.

Soil biological improvements.—The “soil food web” or biological community is the living component of soil. Soil is a living system. Optimum soil quality and productivity cannot be achieved unless the soil supports a diverse, strongly active biological community. A single handful of healthy soil contains more individual microbes, bacteria, fungi, protozoa, beneficial nematodes, micro-arthropods, and larger animals, such as earthworms, than there are people on all the earth. Soil organisms support plant health as they decompose organic matter, cycle nutrients, and control soil organisms considered crop pests. They also decompose or fix pesticides and nutrients that might otherwise enter water and become pollutants. Many organisms enhance soil aggregation and porosity (soil structure), thus increasing infiltration and reducing runoff.

Organic matter is the key to the biological health of soil. It serves as the food source for the numerous types of beneficial soil organisms. Thus, biological improvements require additions of organic matter, less tillage, and more careful selection and application of fertilizers and pesticides. These improvements in turn support a growing

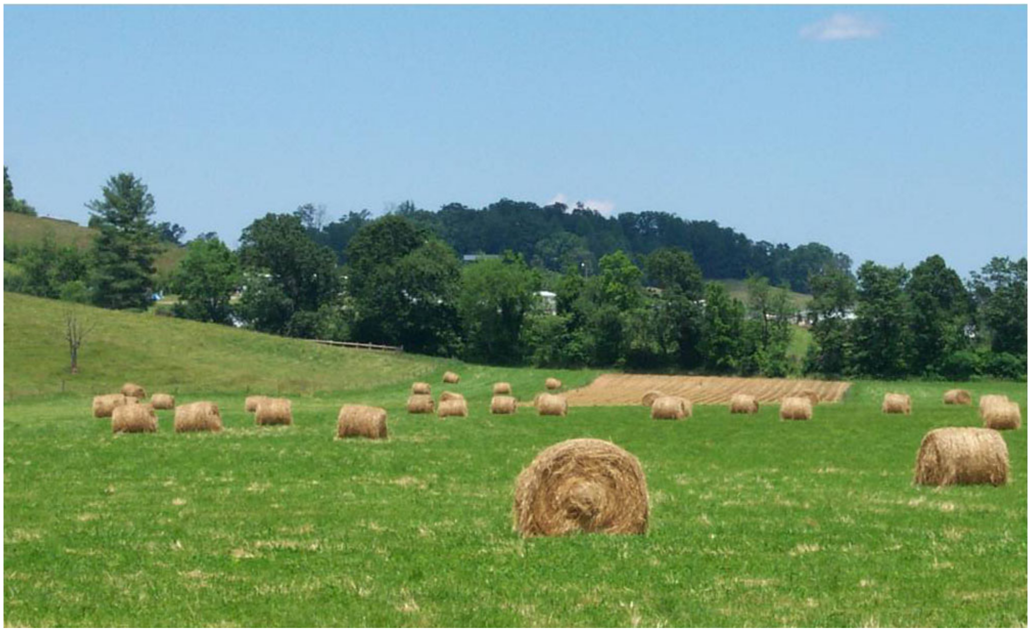

Figure 6.—Pasture and hayland management often utilizes several different soils in the same field. French loam, 0 to 3 percent slopes, occasionally flooded, is in the foreground. Tate loam, 8 to 15 percent slopes, is in the middle ground to the left; Dillard loam, 1 to 5 percent slopes, rarely flooded, is in the middle ground to the right. Clifton clay loam, 15 to 30 percent slopes, moderately eroded, is behind the tree line in background.

population of soil organisms that steadily enhance the soil's physical and chemical properties and support plant health. All of this contributes to agricultural productivity and air and water quality.

Pasture and Hayland

In 2002, according to the North Carolina Cooperative Extension Service of Madison County, Madison County had approximately 42,320 acres of pasture and 6,500 acres of hayland.

A successful livestock enterprise depends on a forage program that provides large quantities of good-quality feed. In most areas of pasture and hayland in Madison County, renovation, brush control, and measures that prevent overgrazing are needed. The soils in the survey area vary widely in their ability to produce grasses and legumes because of differences in such properties as depth to bedrock or sand and gravel strata, internal drainage, and available water-holding capacity. Great differences in soil properties can occur within short distances and commonly within the same field. For example, wet bottomland soils, such as French soils, commonly join steeper, well drained terrace and upland soils, such as Evard, Unison, and Clifton soils (fig. 6).

Some pastures on steep side slopes are on eroded Evard and Clifton soils. These areas show cow paths, know as catsteps, on the contour that support very little forage. Rooting depth and available water-holding capacity are limited in these areas due to overgrazing, compaction, and erosion. These areas are easily susceptible to drought and further erosion.

Pastures on high mountain ridges and steep side slopes above 4,000 feet in elevation experience extreme winter conditions, especially on north-facing slopes. Pastures on these landscapes can be damaged by frost heave and late fall grazing which does not allow forage plants time to recover before winter dormancy. They also have a shorter growing season and receive more precipitation than pastures at lower elevations. These weather conditions make pasture establishment and maintenance more difficult.

Pastures tend to be more productive on uneroded side slopes and ridgetops on slopes of less than 30 percent, on such soils as Clifton, Edneyville, Evard, Buladean, Fannin, and Porters. Although eroded, Clifton soils can support good pastures in areas that do not have compacted cow trails, or catsteps, because of the soil's relatively higher natural fertility. Cove soils, such as Tate and Tusquitee, support good pastures because of the high content of organic matter in the surface layer and the high available water-holding capacity of the subsoil.

Soil fertility.—The soils in Madison County have insufficient natural fertility to produce hay and forage crops without soil amendments. This is due to naturally low levels of nutrients in the soil and an acidic soil environment. By decreasing soil acidity with lime, the availability of nutrients and the activity of beneficial bacteria are increased. Lime also neutralizes exchangeable aluminum, reducing aluminum toxicity to crops. Incorporating lime into the soil before planting is important due to its slow movement into the root zone when applied on the surface. Both organic and chemical fertilizers increase nutrient levels in the soil. Soils in Madison County are naturally low in nitrogen and phosphorus. A soil test is recommended, however, to determine proper application rates of lime and fertilizer. The pH in soils such as Mars Hill, Walnut, and Oteen ranges from 5.0 to 7.3 (very strongly acid to neutral), and less lime is required for optimum forage growth. Other considerations are cropping history and the hay or forage crop to be planted or maintained.

Timing of fertilizer application is very important if maximum yield response from pasture and hayland is to be achieved. A general guideline for cool-season forage is to fertilize at or just before periods of early growth. Depending on elevation, aspect, and the season's weather, this is done by fertilizing between late February and late March before spring growth occurs and between mid August and mid September before fall growth occurs.

Pest control.—Herbicides and other pesticides may be necessary in forage crops for controlling weeds and harmful insects. The organic matter and clay content of the soil surface layer and the depth to the water table affect the amount and frequency of soil-applied herbicides and other pesticides. Soils such as Porters, Wayah, Chestoa, Toecane, Tusquitee, Biltmore, Dellwood, Reddies, and Rosman have enough organic matter in the surface layer to inhibit the activity of soil-applied pesticides. Eroded soils such as Clifton, Braddock, and Evard may have enough clay in the surface layer to bind pesticides.

The wet conditions of Ela and French soils and areas with seeps and springs may reduce the effectiveness of soil-applied pesticides and allow for the contamination of surface and ground water. Saturated soils and areas with excess surface water from prolonged rains or irrigation can carry herbicides and other pesticides to surface waters. The contamination of surface and ground water is also a concern in Biltmore, Rosman, Dellwood, and Reddies soils due to a high leaching rate caused by the low content of clay. Table 20 shows depth to water table and flooding frequency for soils in the survey area.

Integrated pest management programs avoid unnecessary pesticide applications. Crops are scouted to determine if pests are present and then monitored to determine when populations merit control in order to prevent economic loss. This allows for the timeliest use of the pesticide and thus the most cost-effective alternative.

Other methods of weed control include the use of goats, biological agents, and mowing. These viable alternatives can be used alone or in combination with chemical weed control. The latest information on these types of weed control can be obtained at the local office of the North Carolina Cooperative Extension Service, the Madison Soil and Water Conservation District, or the Natural Resources Conservation Service.

Species.—The intended use should be considered when forage species are selected. Selected species should provide maximum quality and versatility in the forage program. Legumes generally produce higher quality feed than grasses. They should be grown to the maximum extent possible. The taller legumes, such as alfalfa and red clover, are more versatile than legumes that are used primarily for grazing, such as white clover. Orchardgrass, timothy, and tall fescue are well suited grasses.

The forage species selected for planting should be appropriate for the soil. Deep and very deep, well drained soils should be planted to the highest producing crops, such as alfalfa, or a mixture of alfalfa and orchardgrass or alfalfa and timothy. Sod-forming grasses, such as tall fescue and orchardgrass, minimize erosion in the steeper areas. Alfalfa should be seeded with cool-season grasses in areas where the soil is at least 2 feet deep and is well drained. Evard, Edneyville, Brasstown, Buladean, Clifton, Unison, Fannin, and Tate soils are examples. Alfalfa does poorly on wet soils, such as French and Ela. The more poorly drained soils and the soils that are less than 2 feet deep are suited to clover-grass mixtures or to pure stands of clover or grasses. Legumes can be established through renovation in areas that support sod-forming grasses.

Tall fescue is an important cool-season grass and thrives on soils well suited for both pasture and hay. It can also be established and performs very well on soils with high water tables or clayey subsoils or in eroded areas. Fescue is an excellent companion crop for legumes in pasture mixtures such as ladino or red clover. In the survey area, it is good practice to seed a legume with fescue. In many pastures there is an abundant supply of native White Dutch clover seed in the soil and additional seeding is not necessary. The legume adds to the palatability and nutritive value of the grass and decreases the need for nitrogen fertilizer. For maximum production, nitrogen fertilizer should be applied during the period when the grass is accumulating. Care must be taken to minimize the effects of fescue toxicity caused by the fungus *Acremonium coenophilum* which occurs on fescue plants. This fungus causes large reductions in animal weight gain.

Warm-season grasses that are planted during the period from early April through late May help to supplement cool-season grasses, such as tall fescue. They grow well during warm periods, especially from mid June through September, when the growth of cool-season grasses is slow. Examples of warm-season grasses are switchgrass, big bluestem, eastern gamagrass, indiangrass, and Caucasian bluestem. Annual summer grasses such as sudangrass, pearl millet, and sorghum could be valuable in providing silage and hay in a forage program. Cattle producers could use these grasses for summer forage when cool-season grasses become dormant.

Native bluegrass pastures are on most soils in the county. This grass is a preferred species for horses and sheep. Bluegrass pastures could be improved by the use of high-analysis phosphate fertilizers which encourage the growth of native White Dutch clover and increase the quality of forage.

Orchardgrass, another important species, grows anywhere fescue thrives, except in wet areas, such as on French and Ela soils. Orchardgrass has similar requirements as fescue, but is more sensitive to overgrazing and weed competition. Rotational grazing extends the life of this species. This species is not infected by fescue fungus.

Erosion control.—The majority of pastures and hayland in Madison County are located on land that is too steep or wet to row crop. This can lead to a variety of erosion problems. For instance, severe streambank erosion and downstream sedimentation occur where livestock travel streambanks. Trout streams are particularly vulnerable to damage by sedimentation. Rotating pastures helps to prevent overgrazing. Fencing cattle out of streams helps to prevent erosion. Installing watering systems utilizing springs and wells also helps to prevent erosion.

Pastures on slopes of more than 30 percent are generally too steep for farm equipment. Lime and fertilizer must be applied by hand, or access roads must be built for farm equipment. Hand application of fertilizer and lime is usually uneven and results in poor stands of pasture, which support few cattle. Poor vegetative cover encourages erosion, growth of unwanted weeds, and field border encroachment of shrubs and trees. Where access roads are not economically feasible or hand applications of lime and fertilizer are not practiced regularly, timber production may bring a greater economic return.

Pasture establishment and rejuvenation may present erosion problems on slopes of more than 2 percent. Proper planting dates should be used to ensure a good stand in a timely manner. Alfalfa and cool-season forages such as fescue, orchardgrass, clovers, and bluegrass should be planted between mid March and mid April for best results. Warm-season forages such as sudangrass should be planted in the spring when the danger of frost is past.

Maintenance of pasture and hayland.—Using rotational grazing, implementing a well planned clipping and harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity. Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.

Renovation can increase forage yields in areas that support a good stand of grass. The process includes partially destroying the sod, applying lime and fertilizer, and seeding desirable forage species. Plowing is not recommended for forage establishment or rejuvenation. In plowed areas, the soil can crust over after a rain, resulting in a high seedling mortality rate, and the bare soil is susceptible to severe erosion. Directly seeding into the existing sod is the preferred method. Adding legumes to the stand of grass provides high-quality feed and reduces the amount of nitrogen fertilizer needed. Legumes increase summer production and transfer nitrogen from the air into the soil.

Additional information about pasture and hayland can be obtained at the local office of the North Carolina Cooperative Extension Service, the Madison Soil and Water Conservation District, or the Natural Resources Conservation Service.

Orchards

Jeffrey H. Owen, Area Extension Forestry Specialist, North Carolina State University, helped prepare this section.

In 2002, according to the North Carolina Cooperative Extension Service of Madison County, Madison County had approximately 20 acres of commercial orchards.

Orchards in Madison County are grown for the u-pick, fresh, and juice markets and require intensive management and high maintenance. A short discussion of several points relative to managing orchard crops follows. More detailed information and technical assistance may be obtained from the local office of the North Carolina Cooperative Extension Service, the Natural Resources Conservation Service, or the Madison Soil and Water Conservation District.

Growers should review the “Detailed Soil Map Units” section for information on map unit composition, soil properties and behavior, management concerns and considerations, and suitability ratings. The thickness and texture of soil layers is shown in the USDA texture column in table 17. Table 18 shows the general ranges of clay content and organic matter content in the surface layer. Tables 19 and 20 show depth to bedrock, water table, and flooding frequency for soils in the survey area. This data represents what is typical across the county. Conditions of individual map units may vary.

Map Unit Suitabilities

Table 5 rates the soils for their ability to support orchard crops. *Unsuited, poorly suited, suited,* and *well suited* are used to indicate the degree that soil and naturally occurring map unit characteristics limit orchard production. These suitability ratings are guides for consideration by commercial operations with goals that include maintaining the integrity of the ecosystem, a sustainable harvest, and a cost-effective level of management. Slope is considered a limitation for safe equipment use. Ratings are based on land that is presently cleared. The cost of land clearing and the impact on the soil resource will lower the suitability. The size of a management area and/or condition of the soil resource due to past management decisions was not considered. Soil limitations may be overcome with increased management, which in turn increases the cost of production. The cost of doing business varies from site to site and depends on short- and long-term management goals and the unique set of soil, plant, landscape, and climatic relationships on each site. An onsite investigation is recommended to determine site-specific conditions, especially on flood plains, in drainageways, in map units with slopes of more than 30 percent, and on sites at elevations above about 4,000 feet.

Technical assistance may be obtained from the local office of the North Carolina Cooperative Extension Service, the Madison Soil and Water Conservation District, or the Natural Resources Conservation Service.

Soil-Plant-Landscape-Climate Relationships

Selecting apple varieties to manage is dependent on an assortment of soil, plant, landscape, and climatic variables and their interactions. These include apple variety requirements, past land management, elevation, aspect, landscape position, soil type, and rainfall. Site preparation, maintenance, related management costs, and market demand should also be considered. An onsite investigation is recommended to determine site-specific conditions, especially on flood plains, in drainageways and coves, in map units with greater than 30 percent slopes, and on sites above elevations of 3,800 feet.

Naturally occurring site factors influence site productivity and are important to consider. Elevation and aspect affect the amount of sunlight a site receives and the rate of evaporation. Higher elevations host shorter growing seasons and/or harsh climates. Soils on cool, north- to east-facing aspects generally have a surface layer that is thicker and has more organic matter than soils on warm slopes. Due to the cooler air temperatures associated with the north- to east-facing aspects, there is a potential for late spring frost to damage new growth in some years. Slow air drainage and/or frost pockets may also allow late spring frost to damage new growth in some years in drainageways and in coves. Sites on south-facing slopes are warmer and drier than those on north-facing slopes. Soils on warm side slopes include Evard, Edneyville, and Buladean. Cheoah and Porters soils are on cool side slopes, and Tate and Tusquitee soils are in coves and on footslopes. Flood-plain soils are not suited due to soil wetness, flooding, and the high potential for frost damage.

The amount of rainfall, elevation, and length of growing season also influence site productivity. Summer rainfall in the survey area is variable. Growth on shallow and moderately deep soils, such as Ashe, Chestnut, Cowee, and Ditney soils, is limited by the low available water-holding capacity. While rainfall generally increases with elevation, productivity gains may be offset by the shorter growing season and/or climatic conditions. For orchards, the most productive sites are generally below about 3,800 feet in elevation.

Topography should be uniform and sloping to allow for good air drainage and to minimize the occurrence of frost pockets. The steepness and length of slopes, landform shape, and position on the slope also affect water movement and availability. Sites that are gullied or have ravines or abrupt slope changes should be avoided. Trees planted in wet soils or those subject to flooding are affected by seeps and springs. Those planted in natural drainageways produce low yields and are more susceptible to disease. Orchards should be established near an adequate supply of water. Good sites are in areas of very deep, well drained soils. Examples are Evard, Edneyville, Clifton, and Tate soils.

Layout and Erosion Control

The layout of an orchard should include outlets for water flowing from higher areas and for water flowing out of the orchard. Field borders and diversions, which empty into grassed waterways, dispose of flowing water without causing erosion. A healthy ground cover controls runoff, allows for greater infiltration into the soil, and reduces evaporation losses. Sod should be established between rows of trees and on all roads and erosion-control structures. It should be established as construction proceeds. Rows of trees should be laid out on the contour or across the slope and as nearly parallel to each other as possible. This arrangement helps to control erosion and allows for easy access. Planning for access roads is very important. Short or dead end roads, which make equipment use difficult, and roads with sharp turns or grades above 10 percent should not be constructed. Wet areas or natural drainageways should be avoided. Water bars, side ditches, and culverts should be installed when these areas are unavoidable.

Soil Quality

A short discussion of several points relative to soil quality improvements follows. Enhanced soil quality can help to reduce the onsite and offsite cost of soil erosion, improve nutrient utilization, and ensure that the soil resource is sustained for future use. The soil’s physical, chemical, and biological properties must be at optimal levels for high yields to be maintained on a sustainable basis.

Soil fertility.—The soils in Madison County have insufficient natural fertility to sustain orchards. Typically, they are acidic and low in nitrogen and phosphorus. Both organic and chemical fertilizers increase nutrient levels in the soil. By decreasing soil acidity with lime, the availability of nutrients and the activity of beneficial bacteria are increased. Lime also neutralizes exchangeable aluminum, reducing aluminum toxicity to crops. Applications of lime and fertilizer should be determined by soil tests and by plant tissue analysis. Incorporating lime into the soil before trees are planted is important due to its slow movement into the root zone when applied on the surface. Lime and fertilizer should also be applied to the access roads and erosion-control structures to maintain the sod.

Soil biological improvements.—Optimum soil quality supports a sustainable harvest and a cost-effective level of management and cannot be achieved unless the soil supports a diverse, strongly active biological community. Organic matter is the key to the biological health of the soil. It serves as the food source for numerous types of beneficial bacteria, fungi, protozoa, nematodes, micro-arthropods, and larger animals. Biological improvements require more organic matter, healthy cover crops, and a careful selection and application of herbicides and other pesticides. These improvements also benefit the soil’s physical and chemical components. The available supply of nutrients for plant growth is affected by several soil properties, including the organic matter content of the surface layer. Decomposition of organic matter to humus and the mineralization of humus release nitrogen and other nutrients, such as calcium, magnesium, and potassium, to plants. Organic matter can be added to the soil in some cases or be allowed to build up in place under cover crops. Removing the cover crop with herbicides or tillage allows for the rapid break down of organic matter.

Pest control.—Herbicides and other pesticides may be necessary for controlling weeds, harmful insects, and disease and, where possible, should be applied by banding or spot treatment. Label directions must be followed to control target organisms and minimize contamination of soil, water, air, and nontarget organisms. Soil properties, such as organic matter content and clay content of the surface layer affect the rate of soil-applied applications. Estimates for these properties were determined for the soils in this survey area. The thickness and texture of the soil layers is shown in the USDA texture column in table 17. Table 19 shows the general ranges of clay content and organic matter content in the surface layer.

In some areas, the organic matter content of a soil may be outside the range shown in table 18. The content may be higher in soils that have received high amounts of animal or manmade waste. Soils that have recently been brought into cultivation (pasture conversion) may have a higher organic matter content in the surface layer than similar soils that have been cultivated (cropland conversion). Lower levels of organic matter are common in soils where the surface layer has been partly or completely removed by erosion, land smoothing, or other activities such as woodland clearing.

Soils such as Cheoah, Porters, and Tusquitee have enough organic matter in the surface layer to inhibit the activity of the soil-applied pesticide. Current soil tests should be used to measure the organic matter content before soil-applied rates are determined. Refer to the label of the pesticide container for further instructions. Eroded soils such as Clifton and Evard may have enough clay in the surface layer to bind herbicides and other pesticides.

The wet French and Ela soils and areas with seeps and springs may reduce the effectiveness of soil-applied pesticides and allow the contamination of surface and ground water. Saturated soils and areas with excess surface water from prolonged rains or irrigation can carry herbicides and other pesticides to surface waters. The contamination of surface and ground water is also a concern in Biltmore, Rosman, Dellwood, and Reddies soils due to a high leaching rate caused by low content of clay. Table 20 shows depth to water table and flooding frequency for soils in the survey area.

Erosion-control practices, such as permanent ground cover and grassed filter strips in drainageways and field borders, help to minimize soil loss and runoff that can carry absorbed or dissolved herbicides and other pesticides to surface waters. Utilizing weather forecasts and scheduling irrigation so it does not conflict with herbicide and pesticide use reduce contamination problems.

The pesticide product labels show specific application rates based on the organic matter content and clay content of the soil. Refer to the “Detailed Soil Map Units” section for information on map unit composition, soil properties and behavior, and management concerns and considerations.

Integrated pest management programs avoid unnecessary pesticide applications. Orchards are scouted to determine if pests are present and then monitored to determine when populations merit control in order to prevent economic loss. This allows for the timeliest use of the pesticide and thus the most cost-effective alternative.

Other methods of weed, pest, and disease control include the use of goats, biological agents, mulching, hand weeding, and mowing. These viable alternatives can be used alone or in combination with chemical control. The latest information on these types of control can be obtained at the local office of the North Carolina Cooperative Extension Service, the Madison Soil and Water Conservation District, or the Natural Resources Conservation Service.

Ornamental Crops

Jeffrey H. Owen, Area Extension Forestry Specialist, North Carolina State University, helped prepare this section.

In 2002, according to the North Carolina Cooperative Extension Service of Madison County, Madison County had approximately 1,075 acres of ornamental crops.

A short discussion of several points relative to managing ornamental crops follows.

More detailed information and technical assistance may be obtained from the local office of the North Carolina Cooperative Extension Service, the Natural Resources Conservation Service, or the Madison Soil and Water Conservation District.

Growers should review the “Detailed Soil Map Units” section and the information in table 5 for map unit composition, soil properties and behavior, management concerns and considerations, and suitability ratings. The thickness and texture of soil layers is shown in the USDA texture column in table 17. Table 18 shows the general ranges of clay content and organic matter content in the surface layer. Table 20 shows depth to bedrock, water table, and flooding frequency data for soils in the survey area. This data represents what is typical across the county. Conditions of individual map unit delineations may vary.

Map Unit Suitabilities

Suitability ratings are guides for consideration by commercial operations with goals that include maintaining the integrity of the ecosystem, a sustainable harvest, and a cost-effective level of management. Ratings are based on land that is presently cleared. The cost of land clearing and the impact on the soil resource lower the suitability. Size of a management area and/or condition of the soil resource due to past management decisions was not considered. Two examples of soil conditions that negatively affect current productivity and suitability are severe erosion and soil compaction. Slope is considered a limitation for safe equipment use.

Table 5 rates the soils for their ability to produce some of the ornamental crops in Madison County. *Well suited, suited, poorly suited,* and *unsuited* are used to indicate the degree of the major soil limitations to be considered in ornamental crop production. *Well suited* indicates that no limitations affect production although inclusions of limiting, dissimilar soils or site features may be present. *Suited* indicates that one or two limitations affect production. *Poorly suited* indicates that two or more limitations affect production. Some of these limitations may be overcome by higher levels of management which, in turn, increase the cost of production. *Unsuited* indicates the occurrence of limitations that cannot be overcome.

An onsite investigation is recommended to determine site-specific conditions, especially on flood plains, in drainageways, in map units with slopes of more than 30 percent, and on sites at elevations above about 4,000 feet.

Technical assistance may be obtained from the local office of the North Carolina Cooperative Extension Service, the Madison Soil and Water Conservation District, or the Natural Resources Conservation Service.

Soil-Plant-Landscape-Climate Relationships

Ornamental crops are grown throughout Madison County and include Christmas trees, mountain laurel, rhododendron, hemlock, boxwood, and other species of native trees, shrubs, and herbaceous plants used in landscaping. Hybrid trees and shrubs such as holly, juniper, and yews are also grown. Selecting species to grow is dependent on a variety of soil, plant, landscape, and climatic variables and their interactions. These variables include individual species requirements, past land management, elevation, aspect, landscape position, soil type, and rainfall. Site preparation, maintenance and related management costs, and market demand should also be considered. An onsite investigation is recommended to determine site-specific conditions, especially on flood plains, in drainageways and coves, for map units on slopes of more than 30 percent, and on sites with elevations above 4,000 feet.

Elevation and aspect.—Naturally occurring site factors are important to consider due to their influence on site productivity and a wide variety of management decisions. In general, the most productive sites are generally below 4,000 feet in elevation. At the higher elevations, growing seasons are shorter and/or climates are comparatively harsh. Aspect affects the amount of sunlight a site receives and the rate of evaporation. Soils on cool, north- to east-facing aspects generally have a surface layer that is thicker and has more organic matter than that of soils on warm slopes. Due to the cooler air temperatures associated with the north- to east-facing aspects, there is a potential for late spring frost to damage new growth in some years. Slow air drainage and/or frost pockets may allow late spring frost to damage new plant growth on flood plains, in drainageways, and in coves. Sites on south-facing slopes are warmer and drier than those on north-facing slopes. Evard, Mars Hill, and Buladean soils occur on warm side slopes. Cheoah and Porters soils occur on cool side slopes. Tate and Unison soils are in coves and on footslopes. Rosman, Reddies, and Dellwood soils occur on flood plains.

Rainfall and droughtiness.—The amount of rainfall, elevation, and length of growing season influence site productivity. Summer rainfall in the survey area is fairly even and abundant. While rainfall generally increases in amount as elevation increases, productivity gains may be offset by a shorter growing season and/or climatic conditions. Growth on soils that are shallow or moderately deep to bedrock, such as Cleveland, Unicoi, Ashe, Burton, Chestnut, Cowee, Unaka, and Ditney soils, is limited by a low water-holding capacity. In addition, inclusions of soils that have a high mica content are also limited due to a low water-holding capacity.

Landform and soil water.—The position on a landform, steepness and length of slope, and landform shape (such as convex or concave) affect water movement and availability. A healthy ground cover controls runoff, allows for greater water infiltration into the soil, and reduces evaporation losses. Areas where water ponds or concentrates, such as toeslopes, footslopes, drainageways, and concave and depressional areas, are susceptible to phytophthora root disease in Fraser fir and other susceptible ornamentals. These areas should be avoided. Phytophthora root disease is a concern on upland, cove, and flood plain sites regardless of landform or soil type. If the fungus has been introduced to any site and if during an extended rainy period soils become saturated with water, root disease can be established and spread.

Other soil-site properties.—Native and hybrid ornamental crops grow well on well drained, loamy soils. Too many surface stones, boulders, and coarse fragments in the soil, however, can hinder cultivation or ball and burlap harvesting. Depth to bedrock may also limit rooting depth. Sites should be protected, especially at higher elevations, from northwest winter winds which can desiccate plants. Flooding even on an occasional basis is of concern due to the extended length of time ornamental crops are in the field.

Clay content.—The clay content should be between 15 to 30 percent for optimum propagation and ball and burlap harvesting. Soils with a low clay content may need supplemental irrigation due to a low water-holding capacity and droughtiness. Soils with clay contents less than 15 percent in the upper 20 inches should not be used for ornamental species that are to be ball and burlap harvested. These soils do not cling together and thus ball poorly. Soils that have a clay content of more than about 30 percent should not be used for ornamental species. These soils hold excess moisture around roots and thus can cause the poor growth of plants and encourage phytophthora root disease. Access with machinery is limited when the soil is wet. Also, soils that have a high clay content can only be dug within in a narrow range of soil moisture. This prevents damage to the root ball but may not coincide with harvest schedules.

Upland soils, such as Evard, Edneyville, Cheoah, and Porters soils, and the colluvial Tate soils are suited for adapted ornamental crops. The flood-plain Rosman, Dellwood, and Reddies soils are also used to grow certain adapted ornamentals. Flood-plain soils present special management concerns due to a low water-holding capacity, moderately rapid or rapid internal drainage, surface fragments, cold air drainage, frost, and flooding frequency.

Erosion control, site preparation, and access.—Disturbing as little of the planting area as possible helps to prevent excessive erosion, maintains water quality, and protects the beneficial surface layer. Once a site is prepared and planted, areas between plants rows should remain in permanent vegetative cover. Planting in a grid arrangement allows for easy access by hand labor and equipment used for mowing or harvesting. Sites should be selected in areas that have an adequate supply of clear water for irrigation.

Roads.—Access roads should be carefully planned and constructed on the contour. They should not be constructed in natural drainageways, wet areas, or where the roadbed grade would exceed 10 percent in slope. Limitations based on depth to bedrock, the presence of rocky areas, and the quantity of surface stones and boulders should also be considered. Vegetating cleared, graded, and cut and fill slopes as construction proceeds and using erosion-control structures, such as silt fences or catch basins, help to maintain soil stability and prevent sediments from leaving the site. Roads should be graveled or seeded with perennial vegetation, allowing for year-round use. Lime and fertilizer should be applied regularly to maintain the sod. Refer to the “Building Site Development” part of this section for more detailed information.

Marginal sites.—Areas that are forested and would require major timber and stump removal are less favorably suited for ornamental and Christmas tree production. Clearing woodland and converting it to ornamental crop production would create a severe erosion potential and is not recommended. A positive cost-benefit ratio, especially for clearing slopes greater than 30 percent, is uncertain.

Map units that have slopes of more than 30 percent are marginally suited due to limitations to safe equipment use. Access roads might be built and maintained, but they thus increase the cost of production. Labor costs and the amount of time needed for harvest increases on these steep and very steep slopes. Also, plant shape (especially the lower branches) can be detrimentally affected on the uphill side of tree trunks or plant stems. Loss of the bottom whorl of a Christmas tree due to slope will add 1 or 2 years to a rotation.

Line-out beds.—Line-out beds should be located near an adequate supply of clear water for irrigation. They require soils with about 10 to 15 percent clay in the upper 8 to 12 inches. Soils that have more clay hold seedling roots so tightly that tearing and breaking can result during harvesting. Such soils also hold water longer, providing a window for phytophthora root rot to grow. Flood-plain soils that have dark, sandy surface layers, such as Rosman and Reddies, are suited to line-out beds but require irrigation. Cove and upland soils with dark surface layers, such as Tusquitee and Porters soils, may also be suited to line-out beds. Their relatively high content of clay and organic matter in the surface layer may be prohibitive due to a high water-holding capacity and the related susceptibility to phytophthora root disease.

Soil Quality

A short discussion of several points relative to soil quality improvements follows. Enhanced soil quality can help to reduce the onsite and offsite cost of soil erosion, improve nutrient utilization, and ensure that the soil resource is sustained for future use. The soil’s physical, chemical, and biological properties must be at optimal levels for production levels to be maintained on a sustainable basis.

Soil fertility.—While the soils in Madison County are acidic and generally low in natural fertility, ornamental crops benefit from soil amendments of lime, fertilizer, and organic matter. Following lime and fertilizer recommendations from soil tests and plant tissue analysis helps to increase the availability of nutrients and is a critical aspect of all management plans, large or small. Since calcium and phosphorus tend to remain in the surface layer of the soil when topdressed, incorporating lime and fertilizer into the soil prior to planting is beneficial. A soil’s physical, chemical, and biological properties must be at optimal levels for production levels to be maintained on a sustainable basis.

Both organic and chemical fertilizers increase nutrient levels in the soil. Application rates are plant specific and should be based on soil tests and plant tissue analysis. Lime and fertilizer should also be applied to access roads and erosion-control structures to maintain the ground cover. Hand application may be required on steep slopes but the benefits of liming and fertilization should not be underestimated. The wet conditions of French soils (and upland areas with seeps and springs) may reduce the effectiveness of the fertilizer and lime and/or allow for the contamination of surface and ground water. The contamination of surface and ground water is also a concern in Dellwood and Reddies soils due to a high leaching rate and the depth to a water table. Table 20 shows the depth to a water table and flooding frequency for soils in the survey area.

Liming requirements are a major concern because high acidity in the soil reduces the availability of nutrients to plants and affects the activity of beneficial bacteria and the other components of the soil's biological community. Lime neutralizes exchangeable aluminum. This counteracts the adverse effects that high levels of aluminum impose on many crops. Liming with calcitic lime adds calcium to the soil, and liming with dolomitic adds both calcium and magnesium.

Soil tests also indicate the need for nitrogen, phosphorus, and potassium fertilizer. Phosphorus and potassium levels vary from field to field due to soil type and past management. Unlike nitrogen, their levels tend to build up in the soil over time if fertilizer has been applied on a regular basis.

Nitrogen fertilizer is required for most crops. Appropriate rates depend on the crop and the potential productivity of the soil. Excessive application of nitrogen beyond what the plant can use during the growing season is not recommended. The excess fertilizer not utilized by the crop creates an unnecessary expense and can result in water pollution through leaching or runoff. Nitrogen can be readily leached from the more sandy textured soils such as Rosman, Dellwood, and Reddies so that it becomes deficient in wet seasons. Split applications of nitrogen may be more effective on these soils during the growing season. Nitrogen rates may be reduced on fields provided that organic matter levels are high. Where the ground cover has been removed by tillage or with herbicides, organic matter tends to break down more rapidly. Erosion-control practices, such as a permanent ground cover and grassed filter strips in drainageways and field borders, help to increase organic matter content and minimize soil loss and runoff that can carry adsorbed or dissolved fertilizer to surface waters.

Soil biological improvements.—Optimum soil quality supports a sustainable harvest and a cost-effective level of management and cannot be achieved unless the soil supports a diverse, strongly active biological community. Organic matter is the key to the biological health of the soil. It serves as the food source for numerous types of beneficial bacteria, fungi, protozoa, nematodes, micro-arthropods, and larger animals. Biological improvements require more organic matter, healthy cover crops, and a careful selection and application of herbicides and other pesticides. These improvements also benefit the soil's physical and chemical components. The available supply of nutrients for plant growth is affected by several soil properties, including the organic matter content of the surface layer. Decomposition of organic matter to humus and the mineralization of humus release nitrogen and other nutrients, such as calcium, magnesium, and potassium, to plants. Organic matter (composted or decayed) can be added to the soil in some cases or be allowed to build up in place under cover crops. Removing the cover crop with herbicides or tillage allows for the rapid break down of organic matter.

Pest control.—Herbicides and other pesticides may be necessary for controlling weeds, harmful insects, and disease and should be applied by banding or spot treatment. Label directions must be followed to control target organisms and minimize contamination of soil, water, air, and nontarget organisms. Soil properties, such as organic matter content, and clay content of the surface layer affect the rate of soil-applied pesticides. Estimates for these properties were determined for the soils in Madison County. The thickness and texture of the soil layers is shown in the USDA texture column in table 17. Table 18 shows the general ranges of clay content and organic matter content in the surface layer.

In some areas, the organic matter content of a soil may be outside the range shown in table 18. The content may be higher in soils that have received high amounts of animal or manmade waste. Soils that have recently been brought into cultivation (pasture conversion) may have a higher organic matter content in the surface layer than similar soils that have been cultivated (cropland conversion). Lower levels of organic matter are common in soils where the surface layer has been partly or completely removed by erosion, land smoothing, or other activities such as woodland clearing.

Pesticide effectiveness.—Soils such as Porters, Wayah, Oconaluftee, Dellwood, Reddies, and Rosman have enough organic matter in the surface layer to inhibit the activity of the soil-applied pre-emergent herbicides and other pesticides. Current soil tests should be used to measure the organic matter content before soil-applied rates are determined. Eroded soils such as Clifton and Braddock may have enough clay in the surface layer to bind pre-emergent herbicides and other soil-applied pesticides. Where these types of soils are managed, growers should refer to the label of the pesticide container for specific instructions and application rates.

The wet conditions of French and Ela soils and areas with seeps and springs may reduce the effectiveness of some pesticides and allow for the contamination of surface and ground water. Saturated soils and areas with excess surface water from prolonged rains or irrigation can carry herbicides and other pesticides to surface waters. The contamination of surface and ground water is also a concern in Rosman, Dellwood, and Reddies soils due to a high leaching rate caused by the low content of clay. Table 20 shows the depth to a water table and the flooding frequency for soils in the survey area.

Erosion-control practices, such as permanent ground cover and grassed filter strips in drainageways and field borders, help to minimize soil loss and runoff that can carry absorbed or dissolved pesticides to surface waters. Utilizing weather forecasts and scheduling irrigation so it does not conflict with pesticide use reduce contamination problems.

Integrated pest management.—Integrated pest management programs avoid unnecessary pesticide applications. Crops are scouted to determine if pests are present and then monitored to determine when populations merit control in order to prevent economic loss. This allows for the timeliest use of the pesticide and thus the most cost-effective approach to chemical control of pests.

Other methods of weed, animal, and disease control include the use of goats, biological agents, mulching, hand weeding, and mowing. These viable alternatives can be used alone or in combination with chemical control. The latest information on these types of control can be obtained from the local office of the North Carolina Cooperative Extension Service, the Natural Resources Conservation Service, or the Madison Soil and Water Conservation District

Phytophthora.—Phytophthora root rot is a soil-borne disease caused by the fungus *Phytophthora cinnamomi*. It is a problem where the movement of air and water is restricted in the soil. This restricted movement may be a function of a high surface organic matter content, clay content, soil compaction, a seasonal high water table, or soil wetness caused by flooding, ponding, overland flow of storm water, or an extended wet spell during which soils remain saturated.

In areas that receive high amounts of water, a high content of organic matter in the surface layer may hold water long enough and on frequent enough basis to allow phytophthora to develop. This is also a concern where the soil is compacted or the clay content of the surface layer or subsoil differ enough that percolation is slowed or stopped and water perches.

Landscape positions where water concentrates such as toeslopes, footslopes, drainageways, areas below wet weather seeps and springs, and concave and depressional spots are susceptible to phytophthora root rot. All map units potentially contain these areas. These areas should be avoided.

The fungus can also be transported from field to field on equipment, by flooding, and by storm water runoff. Potential contamination of irrigation ponds and streams by storm water runoff from contaminated fields should also be considered.

There is also a possibility of transporting phytophthora to the field on plants from infected line-out beds. The aforementioned soil-site conditions and considerations apply to locating and establishing line-out beds. Proper drainage and protection from flooding, overland flow, and ponding of storm water are critical to establishing and maintaining healthy line-out beds.

Yields Per Acre

The average yields per acre that can be expected of principal crops under a high level of management are shown in table 6, parts I and II. In any given year, yields may be higher or lower than those indicated in the table due to variations in rainfall and other climatic factors. Soil quality and the effects of past management decisions affect present-day yields. The land capability classification of each map unit is also shown in the table.

The yields are based mainly on the experience and records of Madison County farmers, conservationists, and agricultural extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The high level of management needed to realize the estimated yields depends on the kind of soil and the crop. Management can include erosion control; protection from flooding; proper planting and seeding rates; planting high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

A high level of management also includes maintaining proper soil reaction and fertility levels as indicated by soil tests. Favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements are critical. The application of nitrogen in excess of that required for potential yields generally is not recommended. The excess nitrogen fertilizer that is not utilized by the crop is an unnecessary expense and can result in the pollution of surface and ground water. Because nitrogen can be readily leached from sandy soils, applications may be needed on these soils more than once during the growing season.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed as the acreage of such crops is presently small. The local office of the Natural Resources Conservation Service or the North Carolina Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops *(19)*. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by numerals 1 through 8. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have few limitations that restrict their use.

Class 2 soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class 5 soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation.

Class 7 soils have very severe limitations that make them unsuitable for cultivation.

Class 8 soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, 2e. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation; *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w, s,* or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section “Detailed Soil Map Units” and in the yields table.

Prime Farmland and Other Farmland of Statewide Importance

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation’s short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation’s prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. The slope ranges mainly from 0 to 8 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 16,529 acres of Madison County, or 6 percent of the total acreage, meets the soil requirements for prime farmland. About 15,886 acres, or 6 percent of the total acreage, meets the soil requirements for farmland of statewide importance. This acreage does not quite meet the requirements for prime farmland.

Approximately 25,500 acres, or 9 percent of the total acreage, is farmland of local importance. This acreage pertains land previously cleared and in (at least) pasture or hayland production or orchards and vineyards, seed beds and line-out beds for ornamental crop production, and Christmas tree production. Most areas require a more hands-on approach to production, less mechanization, and less ground-disturbing activities than typical row crop production. The costs of production are considered acceptable by the producer and the agricultural community. The very stony map units are dominantly pastured.

A recent trend in land use in some parts of the survey area has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 7. Those that are considered farmland of statewide importance are listed in table 8. Those that are considered farmland of local importance are listed in table 9. The lists do not constitute a recommendation for a particular land use. On some soils included in the list, measures used to overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps. The soil qualities that affect use and management are described under the heading “Detailed Soil Map Units.”

Hydric Soils

In this section, hydric soils are defined and described and the hydric soils in the survey area are listed.

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and hydrology *(6, 7, 10, 15)*. Areas identified as wetlands must meet criteria for each of the characteristics. Undrained hydric soils that have natural vegetation support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses are capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part of the profile *(7)*. These soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. To determine whether a specific soil is a hydric or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Criteria which identify the estimated soil properties that are unique to hydric soils have been established *(5)*. These criteria are used to identify a phase of a soil series that normally is associated with wetlands. The criteria are selected estimated soil properties, which are described in “Soil Taxonomy” *(20)* and in the “Soil Survey Manual” *(21)*.

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators that can be used to make onsite determinations of hydric soils in Madison County are specified in “Field Indicators of Hydric Soils in the United States” *(10)*.

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. The determination of an appropriate indicator may require a greater depth. Soil scientists excavate and describe the soils deep enough to understand the redoximorphic processes. After completing the soil description, soil scientists can compare the soil features required by each indicator and the conditions observed in the soil and determine which indicators occur. The soil can be identified as a hydric soil if one or more of the approved indicators occur.

This survey can be used to locate probable areas of hydric soils.

Table 10 lists the map units having components or inclusions that meet the requirements for hydric soils and also have at least one of the hydric soil indicators. This list can help to plan land uses, but onsite investigation is needed to determine the occurrence of hydric soils on a specific site.

Woodland Management and Productivity

Albert Coffey, Forester, and Russell Blevins, District Conservationist, Natural Resources Conservation Service; Dan Manning, Soil Scientist, and John Blanton, Silviculturalist, U.S. Forest Service; and Tony Webb, Madison County Ranger, North Carolina Forest Service, helped prepare this section.

Owners of forestland in Madison County have many objectives. These objectives include producing timber; conserving wildlife, soil, and water; preserving esthetic values; and providing opportunities for recreational activities such as camping and hunting. Public demand for clean water and recreational areas creates pressures and opportunities for owners of forestland.

The landowner interested in timber production is faced with the challenge of producing greater yields from smaller areas. These smaller areas are primarily due to trends in land ownership including increased residential and commercial development. Meeting this challenge requires intensive management and silvicultural practices. Many modern silvicultural techniques resemble the ones long practiced in agriculture. They include establishing, releasing, and thinning a desirable young stand (fig. 7); propagating the more productive species or genetic varieties; providing appropriate rotations and fiber utilization; and controlling insects, diseases, and undesirable species. Although timber crops require decades to grow, the goal of intensive management is similar to that of intensive agriculture. This is to produce a sustainable yield of the most valued crop while maintaining the integrity of the ecosystem.

Forestland covers 211,345 acres, or about 73 percent of the land area, in Madison County. Of this, timberland or commercial forest covers 195,736 acres, or about 68 percent of the county. U.S. Forest Service timberland covers 55,360 acres, or about 19 percent of the county. Timberland or commercial forest is land that is producing or is capable of producing crops of industrial wood and that has not been withdrawn from timber production by government statute or administrative designation. Northern red oak, yellow-poplar, and eastern white pine are the most important commercial timber species in the county because they are adapted to the soil and climate and bring the highest average sale value per acre. Acreage figures were adjusted based on the Continuous Inventory of Stand Condition (CISC) database maintained by U.S. Department of Agriculture, Forest Service, National Forests in North Carolina. Land

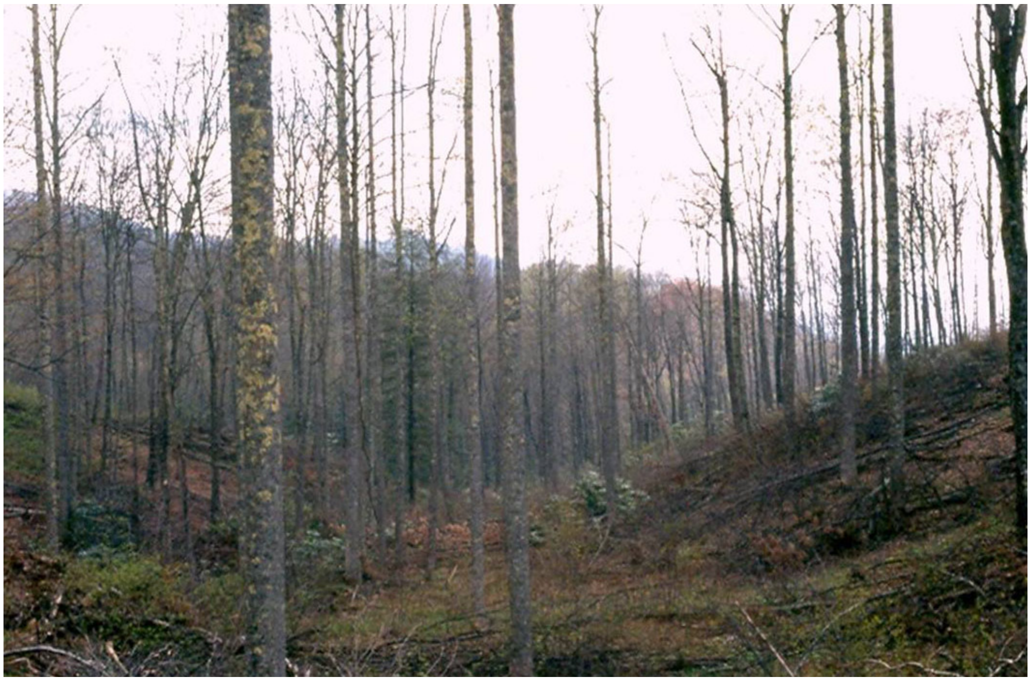

Figure 7.—Thinned stands of yellow-poplar in an area of Porters-Unaka complex, 15 to 30 percent slopes, stony. This species responds well to timber stand improvement, which results in improved productivity.

classes (in CISC) for mountain lands managed by the National Forests in North Carolina are in accordance with Management Area criteria and emphases as detailed in the Land and Resource Management Plan, Amendment 5, Nantahala and Pisgah National Forests, March 1994.

For purposes of forest inventory, the predominant forest types identified in Madison County are as described in the following paragraphs:

White pine-hemlock. This forest type covers 8,588 acres. It is predominantly eastern white pine. Commonly included trees are hemlock, red maple, and sweet birch.

Shortleaf pine. This forest type covers 14,207 acres. It is predominantly shortleaf pine and Virginia pine in combination and constitutes a plurality of the stocking. Commonly included trees are pitch pine, scarlet oak, chestnut oak, white oak, and red maple.

Oak-pine. This forest type covers 18,499 acres. It is predominantly hardwoods, commonly upland oaks. Pine species make up 25 to 50 percent of the stand. Commonly included trees are hickory, red maple, and yellow-poplar.

Maple-beech-birch. This forest type covers 14,205 acres. It is predominantly sugar maple, American beech, yellow birch, or a combination of these species. Commonly included trees are northern red oak, white ash, hemlock, and black cherry.

Oak-hickory. This forest type covers 155,794 acres. It is predominantly upland oaks or hickory, or both. Commonly included trees are yellow-poplar, red maple, and black locust.

For purposes of management, forest types are generally grouped as follows: yellow pine, eastern white pine, upland hardwoods, cove hardwoods, and northern hardwoods. The characteristics of a given site indicate which forest type grows best on that site and are discussed later in this section.

Yellow pine (SAF-75 & 79: Shortleaf Pine and Virginia Pine). This forest type generally occurs on abandoned cropland, in areas that have been cleared or burned and reseeded, and on soils of low productivity on dry, hot ridges and side slopes in the low mountains. Shortleaf pine, pitch pine, and Virginia pine are the dominant species. This type occurs primarily in the Asheville Basin and generally at elevations below 3,000 feet. Various dry site hardwoods such as scarlet oak, chestnut oak, blackgum, and sourwood are associated with this forest type. Soils that are underlain by high-grade metamorphic parent material commonly support this forest type. They include Clifton, Evard, Walnut, Oteen, and Cowee soils. Soils such as Ditney, Unicoi, Sylco, Cataska, Junaluska, and Brasstown in areas underlain by metasedimentary parent material and inclusions of soils with a high mica content in the parent material also support this forest type.

Eastern white pine (SAF-21: Eastern White Pine). This forest type occurs on a wide range of well drained cove and upland sites that previously supported the oak-hickory forest type or in abandoned pastures. Before fire control, white pine may have occupied moist slopes where fires were infrequent or of low intensity. This forest type produces a higher volume of wood and has a shorter rotation than other upland forest types. In Madison County, eastern white pine regenerates naturally where there is a seed source; however, in many areas it is planted. Elevations are mostly below 3,500 feet but can range to as high as 4,000 feet. Soils that commonly support this forest type are Clifton, Evard, Cowee, Edneyville, Buladean, Chestnut, Marshill, and Walnut.

Upland hardwoods (SAF-52: White Oak-Black Oak-Northern Red Oak). This forest type occurs on upland side slopes and ridges on various aspects up to about 4,000 feet in elevation. This is the most extensive forest type in the county. Many stands show effects of past high grading, and oaks typically produce less volume growth than many other species. If properly managed, however, this forest type can produce high-quality timber. Dominant species vary from northern red oak, white oak, and yellow-poplar on cool, moist, north- to east-facing slopes and those shaded by higher mountains to scarlet oak, chestnut, black oak, and hickory on hot, dry, west- to south-facing slopes. Major soils on warm aspects are Evard, Clifton, Cowee, Buladean, Chestnut, Edneyville, Ashe, Ditney, Unicoi, Junaluska, and Brasstown. Major soils on cool aspects are Porters, Unaka, Cheoah, and Chestoa.

Cove hardwoods (SAF-57: Yellow-Poplar). This forest type is in coves and drainageways below about 4,800 feet in elevation. It has the potential to produce high volumes of wood per acre when compared with other forest types. The most common species is yellow-poplar. Stands also include northern red oak, white oak, black cherry, sweet birch, eastern hemlock, white pine, American basswood, yellow buckeye, and white ash. Generally above 4,000 feet, yellow-poplar is less dominant and northern red oak, black cherry, white ash, sweet birch, yellow buckeye, yellow birch, and sugar maple are more common. Soils that commonly support this forest type include Tate, Northcove, Maymead, Toecane, Tusquitee, and Whiteside.

Northern hardwoods (SAF-25: Sugar Maple-Beech-Yellow Birch). This forest type is on cool landscapes at elevations ranging from about 3,500 to 4,900 feet. Below an elevation of 4,200 feet, it is on north- to east-facing slopes or those shaded by higher mountains. Above an elevation of 4,200 feet, it is on side slopes and ridges on various aspects. On prominent ridgetops, on upper side slopes, and at elevations above 4,800 feet, trees exhibit slow growth and poor form due to frequent ice storms and high winds. Common species are northern red oak, mountain magnolia, white ash, beech, sweet birch, yellow birch, black cherry, and sugar maple. A large percentage of the trees in this forest type are commercially valuable species. The major soils are Porters, Unaka, and Cheoah on side slopes and Toecane and Tusquitee in coves. In areas underlain by metasedimentary rock, major soils are Northcove and Maymead in coves and Chestoa on ridges and side slopes.

One of the first steps in planning intensive forestland management is to determine the potential productivity of the soil for several alternative tree species. The most productive and/or valued trees are then selected for each soil type. Site and yield information enables a forest manager to estimate future wood supplies. These

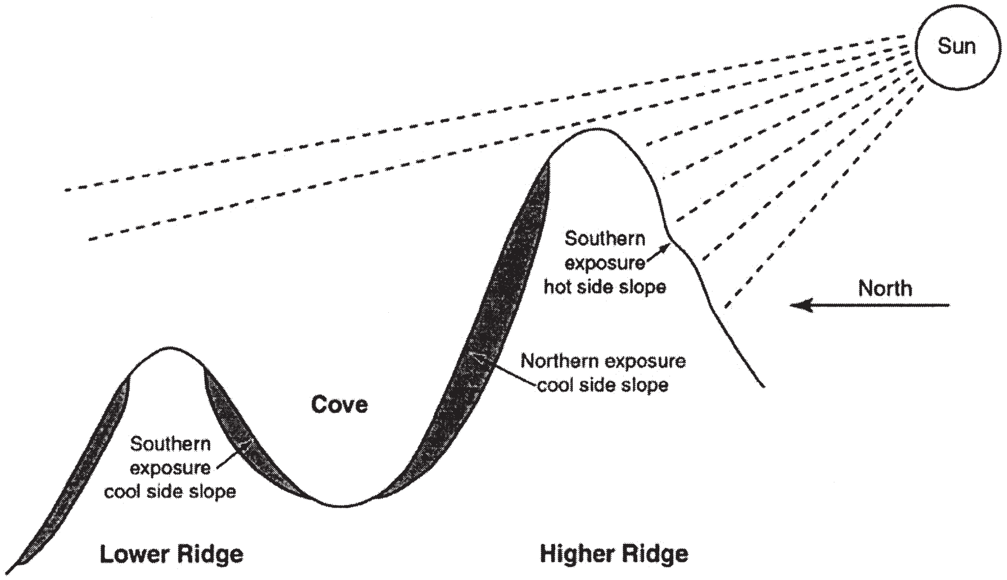

Figure 8.—Cool slopes include north- to east-facing slopes, those shaded by the higher mountains, and commonly those in coves. These areas are more productive but are susceptible to late spring and early fall frosts.

estimates are the basis of realistic decisions concerning short- and long-term timber management goals, expenses and profits associated with intensive forestland management, land acquisition, or industrial investments.

The productive capacity of forestland in Madison County depends on physiography, soil properties, climate, and the effects of past management. Specific soil properties and site characteristics, including soil depth, texture, structure, and depth to the water table, affect forest productivity primarily by influencing available water-holding capacity, aeration, and root development. The net effects of the interaction of these soil properties and site characteristics determine the potential site productivity.

Examples of past management decisions that limit productivity are overgrazing, severe erosion, and timber high-grading. These factors can affect forest health, vitality, species composition, and ultimately the quantity, quality, and value of the timber produced. The potential volume of wood produced by a stand of timber is not always the best indicator of the value of a site. Species composition and quality are as important as volume.

Naturally occurring site factors are also important to consider. The steepness and length of slopes and landform position affect water movement and availability. Elevation and aspect affect the amount of sunlight a site receives and the rate of evaporation. Sites on south-facing slopes are warmer and drier than those on north-facing slopes. The amount of rainfall and the length of growing season influence site productivity. While rainfall generally increases with elevation, productivity gains may be offset by the shorter growing season. The most productive sites are generally below 4,000 feet in elevation, on north- to east-facing slopes or those shaded by higher mountains, in sheltered coves, or in concave areas, such as on benches, footslopes, and toeslopes (fig. 8). Most soils on these cool slopes have thicker A horizons and have more organic matter than soils on warm slopes. Examples are Porters and Cheoah soils on cool side slopes and Tusquitee and Toecane soils on footslopes.

Map units of soils on warm slopes include minor components such as narrow, unmapped drainageways. These areas can produce higher yields than what is indicative of the soil map unit as a whole. Map units of soils on cool slopes include

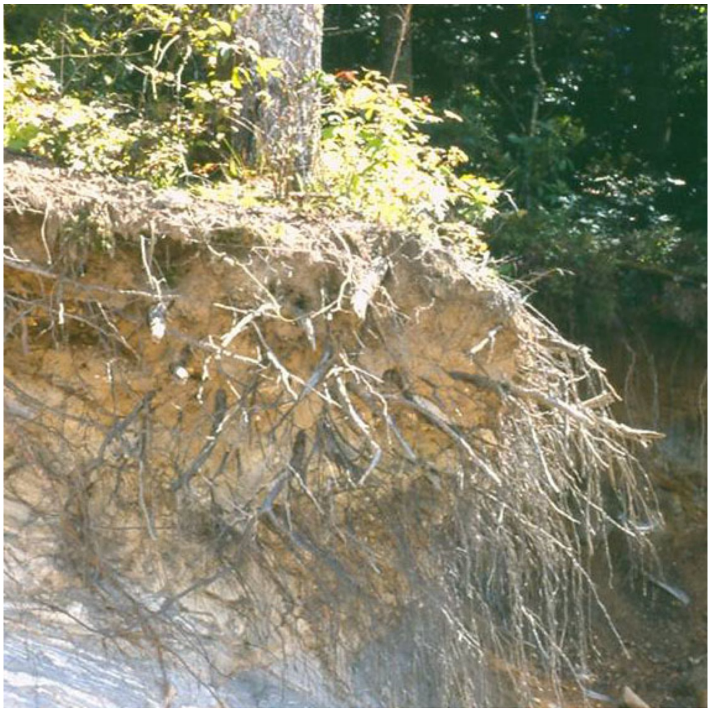

Figure 9.—Woodland productivity in shallow and moderately deep soils may be limited due to a thinner reservoir of soil moisture and a restricted root zone.

minor components such as exposed spur ridges. These areas can produce lower yields than what is indicative of the soil map unit as a whole. In either case, different tree species may occur in these areas.

A knowledge of soils helps to provide a basic understanding of the distribution and growth of tree species on the landscape. For example, yellow-poplar grows well on deep or very deep, moist soils and scarlet oak and pine are common in areas where the rooting depth is restricted or the moisture supply is limited. Parent material, landform position, availability of water, and nutrients largely determine which tree species grow on a particular soil.

Soil serves as a reservoir for moisture, provides an anchor for roots, and supplies most of the available nutrients for trees. Organic matter content, soil reaction (pH), fertility, drainage, texture, structure, depth, parent material, and landform position directly or indirectly affect the availability of moisture and nutrients as well as rooting depth. Elevation and aspect are of particular importance in mountainous areas.

The capacity of a soil to serve as a reservoir for moisture, as measured by the available water-holding capacity, is primarily influenced by texture, organic matter content, rooting depth, and content of rock fragments or mica. Because of uneven patterns of summer rainfall in the survey area, available water-holding capacity affects tree growth throughout most of Madison County. This is especially limiting on shallow and moderately deep soils such as Cleveland, Ashe, Chestnut, Cowee, Unaka, and Ditney soils (fig. 9). In soils on steep uplands, much of the water movement during periods of saturation occurs as lateral flow down slope. Thus, soils on lower slopes receive additional moisture due to internal water flow.

Precipitation values fluctuate extensively throughout Madison County and can be divided into three general regions. The eastern and western sections are higher in elevation and average yearly rainfall, while the central section of the county is lower in elevation and annual precipitation. The eastern section averages from 45 to more than

55 inches of precipitation. Within this area, north of Elk Wallow Knob along the Yancey County line, elevations climb to 4,800 feet and rainfall averages more than 55 inches. In the western section, rainfall averages from 45 to more than 58 inches. Within this area, Max Patch Mountain near the Haywood County line, elevations climb to 4,600 feet and receive more than 60 inches of rainfall in some years. The smaller central section parallels the French Broad River from the Buncombe County line in the south to Hot Springs in the north. This area has the lowest elevations and is the driest of the three sections, receiving 35 to 45 inches of rainfall annually. The southern portion within the central section, an area between the towns of Marshall, Mars Hill, and the Buncombe County line, receives an average of 35 to 38 inches of precipitation annually. This is the lowest annual rainfall in North Carolina and one of the lowest on the East Coast.

Low precipitation is the end result of a rain shadow in south-central Madison County. Prevailing weather patterns typically intercept mountain ranges west of the survey area. Rain shadows occur wherever moist air flowing over mountains cause precipitation amounts to drastically increase on the windward side of the mountains and drop significantly less rain on the leeward side.

In the survey area, all of the soils, except for the shallowest, provide an adequate anchor for tree roots. The susceptibility to windthrow, or the uprooting of trees by the wind, is not a major management concern on most soils. Soils with a moderate or severe windthrow hazard include Ashe, Cataska, Chestnut, Cleveland, Cowee, Junaluska, Oteen, Soco, Sylco, Unaka, Unicoi, and Walnut.

The available supply of nutrients for tree growth is affected by several soil properties, including organic matter content of the surface layer. Decomposition of organic matter to humus and the mineralization of humus release nitrogen and other nutrients such as calcium, magnesium, and potassium to plants.

Natural fertility is also dependent on the soil parent material and local geology. Most upland soils have been leached and contain only small amounts of nutrients below the surface layer. Only small amounts of nutrients are made available by the weathering of clay and silt particles. In general most of the soils in Madison County have good rooting depth, receive adequate rainfall, and are relatively productive. Exceptions are soils with a higher mica content that are scattered throughout the south and eastern areas of the county and soils that formed over quartzite and metasandstone (such as Ditney, Unicoi, Sylco, and Cataska) in the Hot Springs area of the county. These soils tend to produce lower quality timber.

The living plant community is also part of the nutrient reservoir. Decomposition of leaves, stems, and other organic material recycles the nutrients that have accumulated in the forest ecosystem. Intensely hot wildfire, excessive trampling by livestock, or erosion can result in the loss of these nutrients. Forestland management should include erosion-control measures and protection from grazing.

This soil survey can be used to plan ways to increase and sustain the productivity of forestland. Some soils are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special reforestation efforts. In the section “Detailed Soil Map Units,” the description of each map unit in the survey area and its suitability for timber includes information about productivity, limitations in harvesting timber, and management concerns in producing timber. Table 11 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of the major soil limitations to be considered in management.

In table 11, ratings of *erosion hazard* indicate the probability that damage will occur when site preparation or harvesting activities exposes the soil. Forests that have been burned or overgrazed are also subject to erosion. Ratings are based on the percent slope. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of moderate or severe indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning harvesting and reforestation activities, or the use of special equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, and susceptibility of the surface layer to compaction. As gradient of the slope and length increase, the use of wheeled equipment becomes more difficult. On the steeper slopes, tracked equipment is needed. On slopes steeper than 40 percent, helicopter or high lead cable logging systems are needed. The rating is *slight* if equipment use is restricted by wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. The rating is *severe* if slopes are so steep that tracked equipment cannot be operated safely across the slope, if wetness restricts equipment use for more than 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. Ratings of moderate or severe indicate a need to choose the best suited equipment and to carefully plan the timing of harvesting and other management activities.

Ratings of *seedling mortality* refer to the probability of the death of the naturally occurring or properly planted seedlings of good stock in periods of normal rainfall, as influenced by kinds of soil or topographic features. Seedling mortality is caused primarily by too much or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, rooting depth, and the aspect of the slope. The mortality rate generally is highest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of moderate or severe indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations. Reinforcement planting is often needed if the risk is moderate or severe.

Ratings of *windthrow hazard* indicate the likelihood that trees will be uprooted by the wind. A restricted rooting depth is the main reason for windthrow. The rooting depth can be restricted by a high water table, bedrock, or a combination of such factors as soil wetness, texture, structure, and depth. The risk is *slight* if strong winds break trees but do not uproot them; *moderate* if strong winds blow a few trees over and break many trees; and *severe* if moderate or strong winds commonly blow trees over. Ratings of moderate or severe indicate that care is needed in thinning or that the stand should not be thinned at all. Special equipment may be needed to prevent damage to shallow root systems in partial cutting operations. A plan for the periodic removal of windthrown trees and the maintenance of a road and trail system may be needed.

Ratings of *plant competition* indicate the likelihood of the growth or invasion of undesirable plants. Plant competition is more severe on the more productive soils, on poorly drained soils, and on soils having a restricted root zone that holds moisture. The risk is *slight* if competition from undesirable plants hinders adequate natural or artificial reforestation but does not necessitate intensive site preparation and maintenance. The risk is *moderate* if competition from undesirable plants hinders natural or artificial reforestation to the extent that intensive site preparation and maintenance are needed. The risk is *severe* if competition from undesirable plants prevents adequate natural or artificial reforestation unless the site is intensively prepared and maintained. A moderate or severe rating indicates the need for site preparation to ensure the development of an adequately stocked stand of the selected species. Managers should plan site preparation and maintenance measures to ensure timely reforestation.

The *potential productivity* of *common trees* on a soil is expressed as a *site index* and a productivity number (volume). The predominant common trees are listed in table 11. Generally, only two or three tree species dominate. The first tree listed for each soil is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

For soils that are commonly used for timber production, the yield is predicted in cubic feet per acre per year. It is predicted at the point where mean annual increment culminates. The estimates of the productivity of the soils in this survey are based mainly on eastern white pine, shortleaf pine, yellow-poplar, and northern red oak.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years (50 years in this survey). This index applies to fully stocked, even-aged, unmanaged stands. Site index may vary considerably among sites with the same soil because of the influence of past management, climate, relief, landform position, aspect, drainage, parent material, and elevation.

The *volume* is the yield likely to be produced by the most important trees, expressed in cubic feet per acre per year. Cubic feet per acre can be converted to cubic meters per hectare by dividing by 14.3. It can be converted to board feet by multiplying by a factor of about 5. For example, a productivity class of 8 means that a soil can be expected to produce about 114 cubic feet per acre per year at the point where mean annual increment culminates, or about 570 board feet per acre per year.

Suggested trees to manage are those that are best suited for planting or, if appropriate conditions exist, natural regeneration. They are compatible with the soils and can produce a commercial wood crop. The short- and long-term timber management goals, landform positions of a site (cool versus warm aspect), and market value are several factors among many that can influence the choice of trees for use in reforestation.

Recreation

Madison County Chamber of Commerce and Madison County Parks and Recreation helped prepare this section.

The soils in Madison County play an important role in determining the suitability for recreational uses, such as picnic and camping areas and golf fairways. Knowledge of soils is valuable for managing areas that have the potential for recreational development.

Recreational opportunities in Madison County are diverse and exist on every landform. The town of Marshall occurs on flood plains, in coves, and along a river gorge. Common soils include Biltmore, Toecane, Tusquitee, Oteen, and Walnut. In contrast, the town of Mars Hill occurs on intermountain hills, terraces, and flood plains. Common soils include Clifton, Evard, Mars Hill, Unison, Dillard, and French. Where cut and fill occurs, Udorthents, loamy, has been mapped. These areas contain restaurants, craft shops, shopping plazas, motels, churches, schools, and other public attractions. Golf fairways and ski slopes are in coves, on ridgetops, and on side slopes in upper watersheds. Soils such as Tusquitee and Toecane occur in coves, and Porters and Edneyville soils occur on mountain side slopes. Access points for whitewater rafting and kayaking occur on flood plains where Biltmore, Rosman, Reddies, and French soils are common (fig. 10). Public festivals annually recognize arts and crafts, theater, a Fourth of July celebration, music, and mountain culture.

Elsewhere in the county, riding stables and trails, bed-and-breakfast inns, country

Figure 10.—The French Broad River, a major recreational resource, traverses the county and parallels Biltmore, Rosman, French, Reddies, and Dellwood soils.

clubs, private residences, and access roads are built in coves, on terraces, on intermountain hills, and on ridgetops and side slopes of low and intermediate mountains. Soils vary greatly depending on geology, aspect, and elevation. They commonly include Evard, Mars Hill, Clifton, Buladean, Walnut, and Porters soils on uplands and Tate and Tusquitee soils in coves. Rural communities often have recreational areas developed on flood plains where French soils commonly occur.

Pisgah National Forest occupies 55,360 acres in the Bald Mountains and Shelton Laurel Creek sections of the county. The most intensively used areas are the Murray Branch and Rocky Bluff Recreation Areas, Silver Mine Campground, and Max Patch Mountain area. The national forest offers picnicking, nature study, trails for hiking, bicycling, horseback riding, and a roadway for motor vehicles. There are 65 miles of the Appalachian Trail which follows ridgetops near the Tennessee State line and also along Main Street in the town of Hot Springs (fig. 11).

Pisgah National Forest lands in Madison County are also used for hunting, fishing, and camping. The forest has been designated State Game Lands by the North Carolina Fish and Game Commission. Most waters in the Pisgah National Forest are also designated as trout streams and are very popular. The U.S. Forest Service allows back-country camping throughout the national forest.

All landforms exist in the national forest, and the soils vary in their ability to support recreational development. Soils on the intermediate and high mountains, such as Porters, Cheoah, Chestoa, Oconaluftee, and Wayah, have thick surfaces layers with a high content of organic matter that are subject to compaction and severe erosion when disturbed by machinery or where trails are built. Cove soils, such as Northcove, Maymead, Toecane, and Tusquitee, have a large amount of stones and boulders that limit recreational development. Because Ashe, Cleveland, Ditney, and Unicoi soils have bedrock near the surface and are associated with rock outcrops, their use is limited for most recreational uses. Soils in the Shelton Laurel Creek and Hot Springs areas have inherited unstable characteristics from the parent rock. Unstable soils, such as Chestoa, Ditney, Unicoi, Sylco, and Cataska, slump and slide when lateral support is removed. The building of trails, access roads, and camp areas could require special design to overcome these limitations.

The soils of the survey area are rated in table 12, parts I and II, according to limitations that affect their suitability for recreation. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The ratings in the table are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season

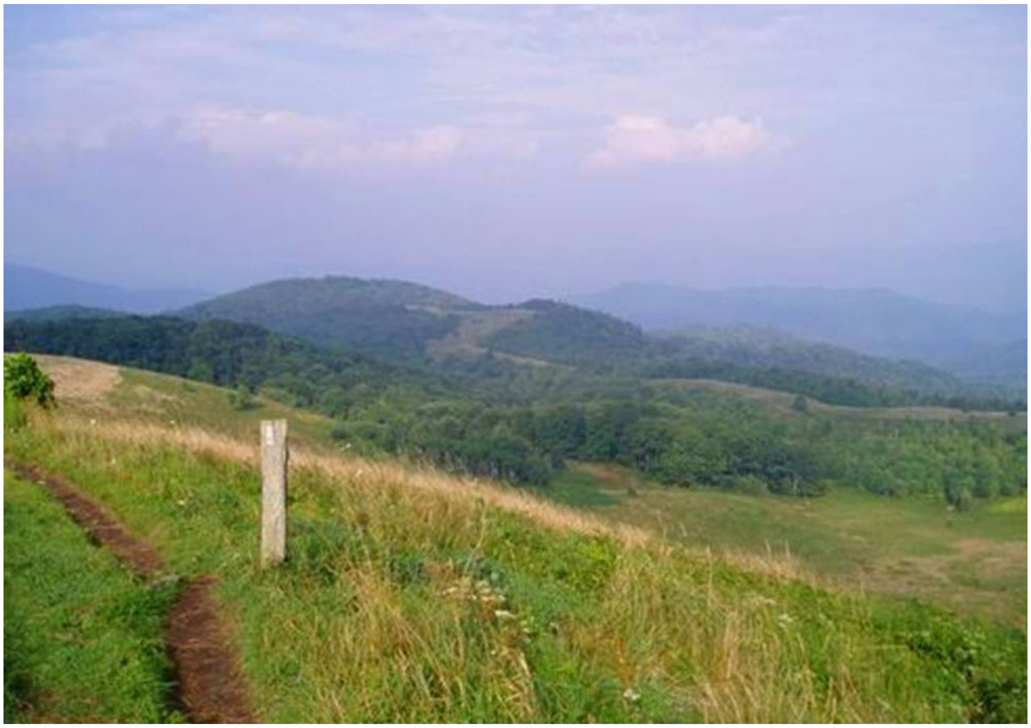

Figure 11.—The Appalachian Trail, a major recreational resource, crosses Wayah and Burton soils on Max Patch Mountain in the foreground. Porters and Unaka soils on Buckeye Ridge are in the background.

when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The information in table 12 can be supplemented by other information in this survey, for example, interpretations for building site development, construction materials, sanitary facilities, and water management.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The ratings are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a cemented pan are the main concerns affecting the development of camp areas.

The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of picnic areas. For good trafficability, the surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Playgrounds require soils that are nearly level, are free of stones, and can withstand intensive foot traffic. The ratings are based on the soil properties that affect the ease of developing playgrounds and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of playgrounds. For good trafficability, the surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Paths and trails for hiking and horseback riding should require little or no slope modification through cutting and filling. The ratings are based on the soil properties that affect trafficability and erodibility. These properties are stoniness, depth to a water table, ponding, flooding, slope, and texture of the surface layer.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer. The suitability of the soil for traps, tees, roughs, and greens is not considered in the ratings.

Wildlife Habitat

Patrick Farrell, Wildlife Biologist, North Carolina Wildlife Resources Commission, and Matthew Flint, Biologist, Natural Resources Conservation Service, helped prepare this section.

Soils are a major factor in determining the amount and distribution of food, water, and cover available for wildlife. The many soils of Madison County help to form a diversity of wildlife habitat that can support many wildlife species. Soils affect the kind and amount of vegetation available to wildlife as food and cover. They also affect the construction of water impoundments and the occurrence of seeps and springs.

Knowledge of soil types and the plant communities they support is valuable in managing wildlife. Generally, wildlife occupy areas that are the most suitable for their food, water, and cover requirements. Yet, soils that have a good potential for wildlife do not always support a large population of wildlife. Human activities can force wildlife onto soils that support less desirable habitat. This can adversely affect the kinds and numbers of wildlife.

Understanding soil-vegetation relationships is important in creating and maintaining productive wildlife habitat. Soil surveys can be used in management programs, such as habitat improvement, species reintroduction, and creation of wildlife refuges. A variety of habitat for a variety of wildlife is an important objective in wildlife management. The needs of wildlife habitat should be considered in all decisions involving land use and management.

The soils of Madison County support vast areas of woodland wildlife habitat. Many areas of woodland consist of immature mixed hardwoods that produce a variety of hard and soft mast. Black bear, turkey, gray squirrel, and woodpeckers, in particular, benefit from such habitat. On the warm, south- to-west facing aspects, Buladean, Evard, Mars Hill, and Stecoah soils provide food and cover, such as oaks, hickory, dogwood, pine, and mountain laurel. On the cooler, north- to east-facing aspects, Porters, Cheoah, and Unaka soils support a plant community consisting of yellow-poplar, American beech, black cherry, and rhododendron. Areas of Ashe and Cleveland soils and rock outcrop support many varieties of lichens, grasses, and forbs. The many twisted and dead trees associated with these areas serve as important den and nesting places for woodland wildlife. The remoteness of these areas also provides refuge for wildlife.

The availability of water and cover are key elements in wildlife habitat. Soils in coves, such as Toecane, Tusquitee, Tate, Heintooga, and Chiltoskie, have a cool, moist environment and frequently have seeps, springs, or streams. Boulders, stones, or dense thickets of rhododendron on these soils also provide cover for wildlife. Raccoon and ruffed grouse frequent these areas for food and cover. Salamanders and other amphibians benefit from the moisture in the coves. Soils in coves on warm, south- to west-facing aspects contribute to wildlife habitat by providing moisture and a diversity of plants to an otherwise uniform plant community.

Woodland wetlands along the larger rivers and streams contribute to habitat diversity. Uncleared Biltmore, French, Dellwood, and Reddies soils host wetland inclusions. These areas support dense plant cover. A variety of wildlife utilize these areas.

The cool-water streams of the county support brook trout, brown trout, and rainbow trout. The French Broad River has populations of smallmouth bass, walleye, and muskellunge. Largemouth bass, bluegill, crappie, and other sunfish are dominant in warm-water ponds.

The severe climate at high elevations limits the potential for diversity among tree species. Soils such as Wayah, Burton, Oconaluftee, and Heintooga support yellow birch, sweet birch, and northern red oak. They also support small stands of red spruce and Fraser fir where red squirrel and several less common species of salamander live. The soils at high elevations support many varieties of soft mast, forbs, and grasses,

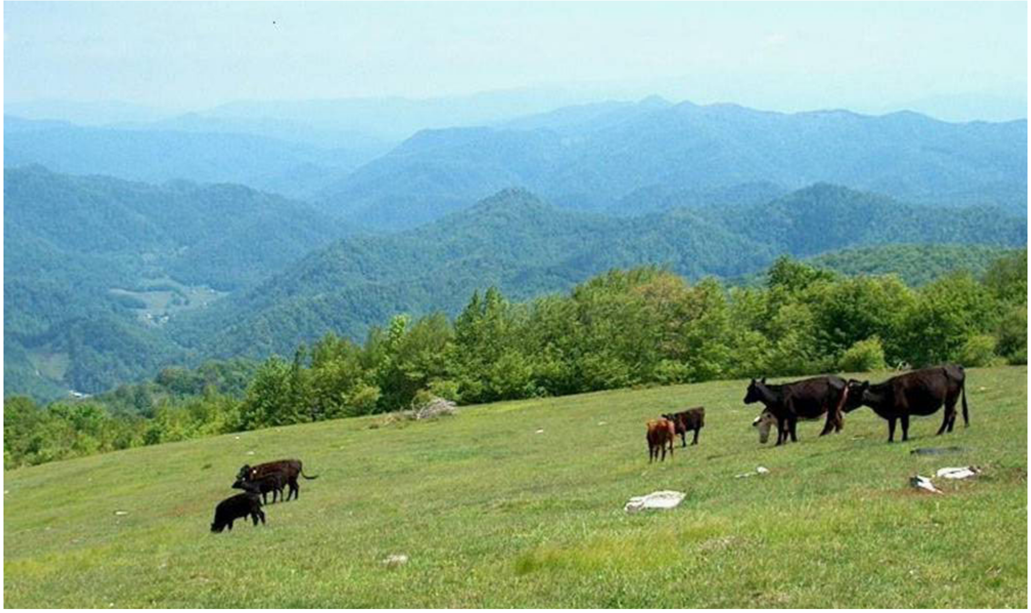

Figure 12.—High mountain summer pasture in an area of Oconaluftee-Guyot-Cataloochee complex, windswept, 15 to 30 percent slopes, bouldery. Open areas such as this provide good habitat diversity for wildlife.

especially on balds and in open areas. Black bear, ruffed grouse, and deer utilize these areas. Hawks and other birds of prey use the open areas for hunting.

The size and remoteness of the habitat at the higher elevations is critical in some wildlife management programs. These areas are becoming increasingly important to species that require large tracts of habitat, such as black bear. The unique grassy balds in areas of Oconaluftee, Guyot, and Cataloochee soils provide wildlife open areas. Shallow, rocky crags in areas of Ditney, Chestoa, and Unicoi soils and areas of rock outcrop have already served as suitable habitat for the reintroduction of the endangered peregrine falcon.

Many open areas are the result of human activities. Generally, open spaces in the county occur mainly on the less slopping landscapes at the lower elevations. The complex soil and vegetation patterns associated with these open areas can provide the most habitat diversity when suitable woodland cover is nearby (fig. 12). These areas are also used for a variety of human activities including agricultural, residential, industrial, and recreational development. Most of these activities preclude use of the land by many wildlife species.

Wildlife, especially large game, are often forced to move to less desirable soils which support less desirable habitat and thus, smaller wildlife populations. Soils that have good potential for providing wildlife habitat do not necessarily support a viable wildlife population. For example, Rosman, Tate, Evard, and Clifton soils have good potential as habitat for wildlife. However, these soils are intensively used for farming and housing, forcing wildlife elsewhere. Other soils, such as Buladean, Mars Hill, and Edneyville, also have good potential as habitat for wildlife. Most of the acreage these soils occupy is in woodland. However, cattle are often given access to woodland and then outcompete wildlife for food.

Wildlife habitat can be created and improved by planting vegetation, maintaining existing plant cover, or promoting the natural establishment of desirable plants. In open areas, soil conservation measures, such as field borders and vegetative filter strips provide the needed food and cover. Establishing plant cover along access roads helps to provide food for wildlife and assists in preventing the sedimentation of lakes and streams.

Many woodland management techniques can be used to increase the potential for wildlife habitat. Openings in the forest canopy encourage plant diversity, and subsequently increase the potential wildlife habitat for many species. In timber or firewood cutting areas, some snags and older trees should be left to provide for cavity nesters, such as woodpeckers, and to provide den sites for raccoons and squirrels. Unusually large trees, uncommon tree species, and some mast-bearing trees and shrubs should also be left. Keeping well dispersed groups of different-aged timber stands with a variety of tree species in every stand is a key to overall benefits for wildlife.

Engineering

Howard Tew, Civil Engineer, Natural Resources Conservation Service, helped prepare this section.

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the “Soil Properties” section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations must be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water-holding capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are described in the Glossary.

The soils in Madison County occur on a variety of landscapes, from flood plains and gently sloping terraces to mountaintops more than 5,000 feet above sea level. The soils in the county are used for a wide range of purposes, from burley tobacco production to construction of multi-unit housing. Soils in many areas may be easily developed using conventional engineering design techniques. Others require specialized engineering and construction techniques to overcome inherent limitations. In planning any engineering activities, the limitations of the soils must be considered if construction problems are to be avoided. The tables in this survey can help to evaluate the soil limitations at potential construction sites.

In order to effectively evaluate soils for engineering or construction purposes, the factors which limit a soil's use must be considered. In Madison County, there are a number of soil-site characteristics which pose engineering difficulties. Among the most important are slope, erodibility, instability (poor bearing strength or shear strength), shrink-swell potential, stoniness, depth to bedrock, freeze-thaw cycle, hydrology, and organic matter content.

Slope.—In Madison County, slopes range from 0 to more than 95 percent. Most soils are on slopes of more than 15 percent. The steeper the slope the greater the limitation. As slope increases, access roads require higher cut faces and longer fill slopes, buildings require stronger foundations, and septic tank filter fields need special design. Some soils may be unsuitable for development because of the slope.

Rainfall runoff from steep watersheds results in high peak rates and flow velocities in receiving streams. Water flow and impoundment structure design must meet exacting standards in order to control the high runoff from these watersheds. Ponds, sediment basins, and waterways are likely to be damaged or may wash out if construction design does not address the complications of steep slopes. Downstream damages and subsequent liability should a failure occur are the consequences of a poor design.

Erodibility.—Erosion control on steep slopes presents a unique challenge. During construction, surface cover is removed, exposing soil to erosion. Piles of soil around a construction site have no resistance to erosional forces. Whenever runoff is allowed to accumulate and move across construction sites uncontrolled, severe erosion occurs. Excavations on sloping mountain soils result in severe erosion and offsite sediment damage unless adequate erosion-control measures are taken (fig. 13).

Cuts on mountainsides generally result in high fills with steep and very steep slopes. Construction which requires significant cuts and fills on mountain side slopes needs careful erosion control. Typically, fill slopes consist dominantly of saprolite and rock fragments. Saprolite can be very erosive, droughty, infertile, and very strongly acid or extremely acid. These characteristics make it difficult to stabilize the slope with vegetation.

Fill slopes for which compaction is not carefully monitored and controlled usually have low density and high porosity. As water moves through a fill slope, settling occurs. As the pores fill with water, the fill slope gets heavier. This causes piping, differential settling, severe slope failure, and offsite sediment damage. Generally, micaceous soils are underlain by micaceous saprolite. Also, soils with a low mica content are commonly underlain by micaceous saprolite. Fill slopes containing micaceous saprolite have slope failure at a lower water content than fill slopes that do not contain a high amount of mica.

Instability.—In order to support loads, such as high fills, buildings, or vehicular traffic, undisturbed soils must possess an inherent bearing strength. Undisturbed sloping soils must also provide a degree of shear strength in order to support their

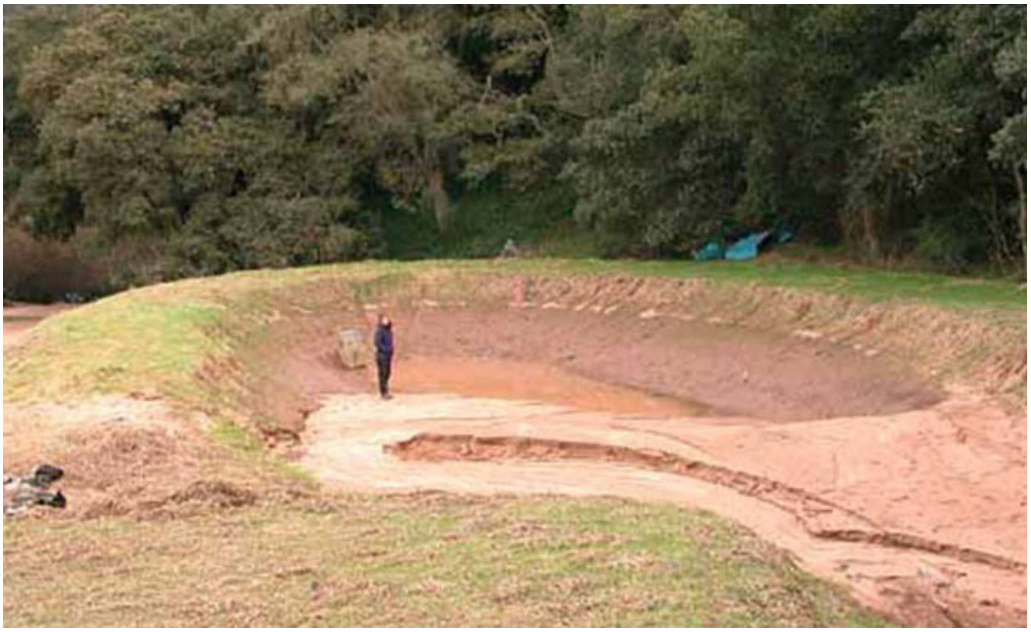

Figure 13.—Sediment basins should be installed before land disturbing activities begin. They keep eroding soil onsite and help to maintain water quality.

own weight. Additional loading puts a greater stress on the soil. When loading stresses exceed bearing strength or shear strength, soils move unpredictably. Loading stresses exceed bearing strength or shear strength more quickly on micaceous soils or soils derived from metasedimentary rock than on other soils. Any excavation cut across the slope of these soils removes the lateral support holding the soil back. In time the weight of the soil above the cut may cause downslope movement, which damages roads and structures.

Soils, like machines, move more freely when lubricated. Such lubrication of soils occurs where high concentrations of mica exist in the soil. Mica can be detected by a slick greasy feel and by a shiny sparkle in soil when struck by the sun or other bright light (fig. 14). Water also is a soil lubricant. When soil becomes saturated with water it tends to move away from the loading forces applied to it. Whether lubricated by natural soil particle characteristics or by water, soil that moves provides very little shear strength. Areas of micaceous soils or soils subject to seeps and springs are poor choices for construction sites due to poor strength manifested by downslope movement. Fannin soils are unstable due to their high mica content. Soils in coves and on toeslopes, such as Tate, Tusquitee, Northcove, Maymead, and Toecane, contain seeps and springs.

Landscapes in northern and southwestern Madison County are unstable because of their metasedimentary geologic origin. Soils in these areas include Ditney, Unicoi, Junaluska, Brasstown, Cheoah, Jeffery, Soco, Stecoah, Sylco, Cataska, Oconaluftee, Guyot, Cataloochee, and Chestoa. The underlying rock occurs in layers which run approximately parallel to the natural land slope. This rock structure provides very little shear strength and tends to slide when loaded. Soil particles weathered from these rocks tend to be flat, allowing them to slip when wet. Any excavation cut across the slope of these soils removes the lateral support holding the soil back. In time the weight of the soil above the cut may cause downslope movement, which damages roads and structures.

On flood plains dominantly along the French Broad River, Shelton Laurel Creek, and Spring Creek, Rosman and Biltmore soils occur. These soils are composed

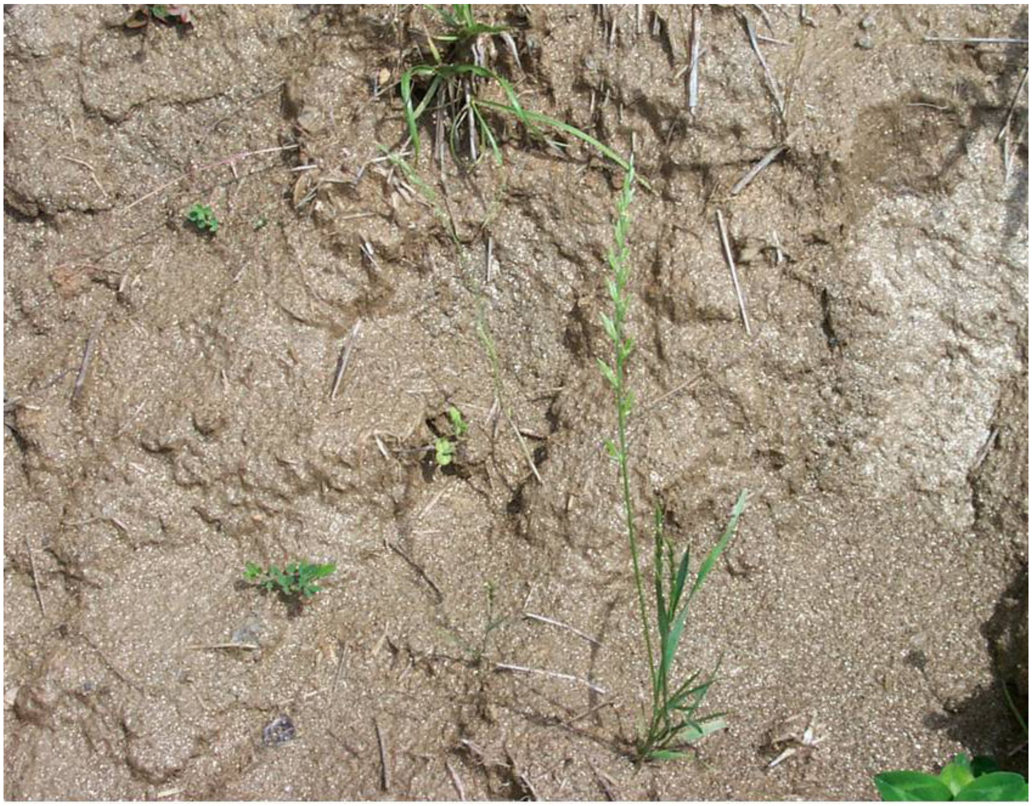

Figure 14.—Soils with higher amounts of mica tend to have a slick greasy feel and a shiny sparkle when viewed in full sunlight.

predominantly of fine to coarse sands and silts. They have little natural plasticity and, when excavated, may become unstable. The soil particles are not bound together by an adhesive of clay and will flow when subjected to excessive loading while wet. Excavations in such soils are difficult and can be dangerous. In addition, side walls tend to cave in and slough off when lateral support is removed. Extensive shoring of excavation pits and walls is needed if cave-ins are to be prevented.

Shrink-swell potential.—Unison soils on terraces and in coves in Madison County have a type of clay that has a moderate shrink-swell potential. Shrinking and swelling causes soil to push against foundations and buried pipes. Over time foundations crack and pipes break. Special planning and design of footings, foundations, and underground utilities may be required before construction begins.

Stoniness.—Most mountain soils contain rock fragments. These fragments range in size from gravel to boulders. Soils are classified skeletal when 35 percent of their volume is rock fragments. Skeletal soils are limited for engineering uses due to the rock content and need special design to overcome the limitations. Cove soils, such as Northcove and Toecane, are skeletal. Other cove soils, such as Tate, Whiteside, and Keener, have fewer stones in the profile. Flood-plain soils are underlain by smooth, water-rounded rock ranging from fine gravel to boulders. Dellwood soils are skeletal beginning at a depth of 10 to 20 inches. Reddies and French soils have 20 to 40 inches of non-skeletal soil above the skeletal layer. The skeletal layer in Rosman and Biltmore soils is even deeper.

The stone content of residual soils in Madison County, such as Buladean, Evard, Chestnut, Walnut, and Junaluska, varies from only a few rock fragments to as much as

35 percent of the soil volume. A soil can vary in rock fragment content from place to place in the county and even within the soil profile.

Construction and development requires compaction of fill material to provide firm foundations and impervious layers. Excess rock fragment content in fill material inhibits compaction. Unacceptable settlement is likely to occur, resulting in damage to buildings, structures, and roads. Compaction of rocky soils fails to produce the homogenous density required in the construction of earth dams and other water-retention structures. Shallow excavations and fine grading may be difficult in excessively stony soils.

When analyzing soils for engineering purposes, rock fragment content should receive special emphasis. Always consider that the Unified Soil Classification System (USCS) evaluates textures only for that fraction of the soil passing the No. 200 sieve (grain size 0.074 millimeter and less). The USCS texture for a specific soil may be shown as SC (sand with clay fines) or CL (low plastic clay), which indicates that the soil is ideal for fill material and will respond acceptably to compaction. The soil, however, may contain rock fragments too large to pass the No. 200 sieve, and thus could render the soil unsuitable for use as fill. Consult the pedon description in the “Classification of Soils” section for evidence of excessive stoniness. An onsite investigation may be necessary in order to determine actual conditions *(4)*.

Depth to bedrock.—Hard bedrock is at a depth of 10 to 40 inches in Ashe, Cleveland, Unaka, Ditney, and Unicoi soils. Hard bedrock is indicated in the pedon descriptions in the “Classification of the Soils” section by the horizon designator “R”. Chestnut, Cowee, Calvin, Walnut, and Junaluska soils have weathered bedrock at a depth of 20 to 40 inches. Buladean, Stecoah, and Brasstown soils have weathered bedrock at a depth of 40 to 60 inches. Weathered bedrock is indicated by the horizon designator “Cr” *(4)*.

Hard bedrock cannot be excavated with machinery unless it is highly fractured. Weathered bedrock can be excavated with machinery. The relative hardness of weathered bedrock generally increases as depth increases. Soft, weathered bedrock which is easily excavated at a depth of 4 feet may become hard and unrippable at a depth of 8 feet. The surfaces of these restrictive features are undulating below the soil, and onsite investigations are needed to determine the topography before construction begins. Material excavated from weathered bedrock layers is dry, brittle, and hard to pack.

Freeze-thaw cycles.—Soils in Madison County located on south- and west-facing slopes are exposed to continual freezing and thawing from November to March. Soils such as Evard, Cowee, Fannin, Calvin, Junaluska, Brasstown, and Clifton are susceptible to frost heaving. Frost action loosens the surface of the soil and heaves it above its normal position. Subsequent thawing may leave the soil surface in a near liquid state. In this condition the soil is subject to erosion and has little load-supporting strength. Unprotected slopes experience erosion, and access roads become impassable. At times a thaw may not affect all of the frozen soil. When this happens an unfrozen, heaved layer of soil is on top of frozen soil. Severe erosion can occur when soil is in this condition as water moves across the top of the frozen soil. A soil surface cover like mulch, vegetation, or gravel can minimize the effects of freezing and thawing.

Frost heaving exerts considerable force on footings and foundations located on susceptible soils. Design of structures must consider potential frost heave damage. Frozen soil resists compaction and should not be used in fill material when compacted densities are important. Depth of frost penetration varies with elevation and aspect across the county. Soils on north-facing slopes develop frost to greater depths than soils on south-facing slopes but do not cycle as often. Frost penetration may exceed 24 inches in some years at the higher elevations in Madison County.

Hydrology.—Soil water affects most all other engineering characteristics of soils already discussed. However, water by itself can limit engineering uses of soils in many ways. Dellwood, Reddies, French, Ela, Rosman, and Biltmore soils occur on flood plains. Ela soils flood frequently, and the others flood occasionally. Dillard, Hemphill, and Statler soils are on low terraces that flood rarely. Any structure may be damaged in a flood. It is best not to use these areas for urban development except possibly for ball fields and playgrounds.

Tusquitee, Toecane, Tate, Keener, and Unison soils in coves and Dillard and Hemphill soils on low terraces have seeps and springs underground or at the surface. Excavations in these soils may cut into underground water flows, thus flooding the hole. Special engineering design is needed to divert the water away from the structure.

Overland flow is a serious water problem on mountain land. Any access road, building, or other structure developed on a mountainside requires a design that diverts surface runoff.

French, Rosman, Reddies, and Dellwood soils have water tables that are close enough to the soil surface to be a limitation to development. Since these soils flood, land use should be limited to agricultural and recreation uses.

Organic matter content.—Wayah, Burton, Oconaluftee, Guyot, Cataloochee, Heintooga, Chiltoskie, Porters, Unaka, Cheoah, Jeffery, Chestoa, Tusquitee, Toecane, Rosman, Dellwood, and Reddies soils have a high organic matter content in the surface layer that causes low strength when used to bear loads. Access roads and construction sites where equipment moves across the surface of these soils are of low quality unless the topsoil is removed or surfaced. It is best to remove the organic rich topsoil and stockpile it for use during the final grading before allowing machinery to travel across the land.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Table 13, parts I and II, shows the degree and kind of soil limitations that affect dwellings with and without basements, local roads and streets, shallow excavations, and lawns and landscaping.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Access Roads

Establishing and maintaining access roads in the survey area has always been difficult. Sedimentation from roads is the largest source of non-point pollution in the survey area. A new road is often built along the path of an old one and past errors are repeated. Currently, road construction in the mountains is at an unprecedented high level. Landowners are reopening old roads to provide access to woodlots and intermittently used farmland. Roads are opened or built each year for logging on private and government-owned lands. The largest effort in road construction, however, is to provide access to real estate developments. In all of these situations, the design of a low-cost, nonpolluting, and essentially self-maintaining road is needed (fig. 15).

The U.S. Forest Service has supported research and demonstrations on design for

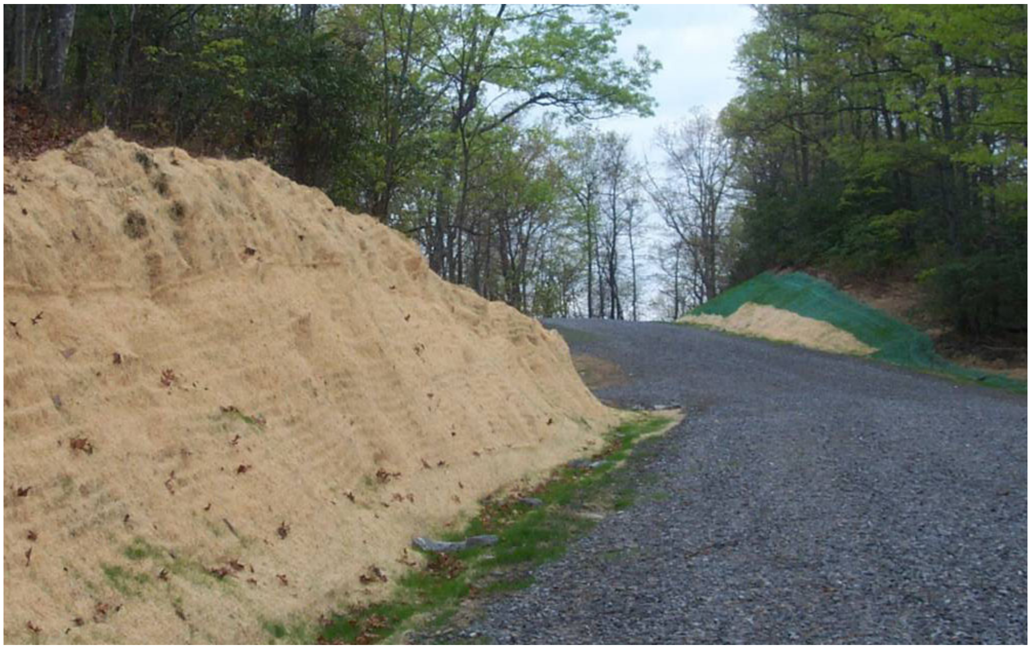

Figure 15.—A well designed, constructed, and properly maintained access road minimizes soil erosion and allows year-round use.

forest access roads for more than 50 years at the Coweeta Hydrologic Laboratory in the Nantahala Mountains in Macon County, North Carolina. Early work demonstrated methods of roadbank stabilization that use brush and native grasses or weed species. Through a series of logging demonstrations, the design of a minimum standard, intermittent-use road was developed and tested. Features of this design apply to both seldom used and development access roads and are as follows:

1. Soils and geology are identified on maps, and site selection or construction practices, or both, are modified where unstable conditions are located.
2. All exposed soil is revegetated as construction proceeds.
3. The siltation of permanent and intermittent streams is reduced by maintaining a filter strip of undisturbed soil between the road and the stream channel and by building at right angles across channels, always using bridges, open pipe, or stream-crossing fords with geotextile and gravel.
4. Vegetation and brush that are cut from the right-of-way are piled below the roadway prior to construction. This barrier intercepts sediment-laden storm water or slows its movement downslope.
5. A covering is provided for loose soil in fills to help control erosion at critical points, such as stream crossings and dip outlets. Mulch netting or scattered branches, brush, cut weeds, or grass help to protect the soil until new grass is established.
6. Surface water is removed from the roadbed by out-sloping and broad-based dips and inside ditches. (In-sloped roads with ditches and culvert ditches are recommended by the Natural Resources Conservation Service for heavily used areas.)
7. Broad-based dips, which are short sections of reverse grade, intercept storm water and divert it off the roadbed. Dips are spaced about 200 feet apart and placed where they can divert water away from stream crossings or steep grades.
8. Maximum grade is restricted to 8 percent wherever possible.
9. Where roadbeds are not graveled, grass is planted on the entire roadway. Although traffic may kill grass in part of the roadbed, the rest of the roadbed will

remain protected against erosion. Gravel is used on the steeper grades, on problem soils, or in high-traffic areas. Large, washed rock (3 inch nominal diameter) provides an effective erosion-control pavement on light-traffic roads. Gravel bonds best to the roadbed if it is added immediately after construction, when the soil is loose.

10. Required maintenance for access roads is increased by traffic in winter and early spring, when the soils are wet and soft. If traffic can be controlled, the annual mowing of grass and brush, supplemented by the periodic cleaning of dip outlets, may be the only maintenance needed. Areas of greater traffic may require that the roadbed be smoothed every 5 to 10 years and the grass and gravel replaced. Areas of heavy year-round traffic require that the road be upgraded and receive scheduled maintenance.

The road design developed and tested at Coweeta Hydrologic Laboratory has influenced Federal, State, and forest industry guidelines and has helped to minimize erosion and the impact on water quality.

In 2005, the Natural Resources Conservation Service published the booklet “The Layman’s Guide to Private Access Road Construction in the Southern Appalachian Mountains,” second edition. (Available at http://www.dfr.state.nc.us/publications/laymans_guide_to_access_road.pdf.) This booklet provides information to home builders and developers on building access roads while minimizing cost and environmental impact. One should consider the detailed information given in the description of each soil in the section “Detailed Soil Map Units” and in the tables. More specific information can be obtained from the local office of the Natural Resources Conservation Service or the Madison Soil and Water Conservation District.

Sanitary Facilities

Table 14, parts I and II, show the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 14 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a high water table, depth to bedrock, and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. The animal waste lagoons commonly used in farming operations are not considered in the ratings. They are generally deeper than the lagoons referred to in the table and rely on anaerobic bacteria to decompose waste materials.

Table 14 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, depth to bedrock, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope or bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

A *trench sanitary landfill* is an area where solid waste is placed in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil excavated at the site. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. The ratings in the table are based on the soil properties that affect the risk of pollution, the ease of excavation, trafficability, and revegetation. These properties include permeability, depth to bedrock or a cemented pan, depth to a water table, ponding, slope, flooding, texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, onsite investigation may be needed.

Hard, nonrippable bedrock, creviced bedrock, or highly permeable strata in or directly below the proposed trench bottom can affect the ease of excavation and the hazard of ground-water pollution. Slope affects construction of the trenches and the movement of surface water around the landfill. It also affects the construction and performance of roads in areas of the landfill.

Soil texture and consistence affect the ease with which the trench is dug and the ease with which the soil can be used as daily or final cover. They determine the workability of the soil when dry and when wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and are difficult to place as a uniformly thick cover over a layer of refuse.

The soil material used as the final cover for a trench landfill should be suitable for plants. It should not have excess sodium or salts and should not be too acid. The surface layer generally has the best workability, the highest content of organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

In an *area sanitary landfill*, solid waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site. A final cover of soil material at least 2 feet thick is placed over the completed landfill. The ratings in the table are based on the soil properties that affect trafficability and the risk of pollution. These properties include flooding, permeability, depth to a water table, ponding, slope, and depth to bedrock or a cemented pan.

Flooding is a serious problem because it can result in pollution in areas downstream from the landfill. If permeability is too rapid or if fractured bedrock, a fractured cemented pan, or the water table is close to the surface, the leachate can contaminate the water supply. Slope is a consideration because of the extra grading required to maintain roads in the steeper areas of the landfill. Also, leachate may flow along the surface of the soils in the steeper areas and cause difficult seepage problems.

The ratings in table 14 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Tables 15, parts I and II, give information about the soils as potential sources of gravel, sand, topsoil, reclamation material, and roadfill. Normal compaction, minor processing, and other standard construction practices are assumed.

The soils are rated *good, fair,* or *poor* as potential sources of topsoil, reclamation material, and roadfill. The features that limit the soils as sources of these materials are specified in the tables. The numerical ratings given after the specified features indicate the degree to which the features limit the soils as sources of topsoil, reclamation material, or roadfill. The lower the number, the greater the limitation.

The soils are rated as a *probable* or *improbable* source of sand and gravel. A rating of *probable* means that the source material is likely to be in or below the soil. The numerical ratings in these columns indicate the degree of probability. The number 0.00 indicates that the soil is an improbable source. A number between 0.00 and 1.00 indicates the degree to which the soil is a probable source of sand or gravel.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 15, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material. The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the lowest layer of the soil contains sand or gravel, the soil is rated as a probable source regardless of thickness. The assumption is that the sand or gravel layer below the depth of observation exceeds the minimum thickness.

Reclamation material is used in areas that have been drastically disturbed by surface mining or similar activities. When these areas are reclaimed, layers of soil material or unconsolidated geological material, or both, are replaced in a vertical sequence. The reconstructed soil favors plant growth. The ratings in the table do not apply to quarries and other mined areas that require an offsite source of reconstruction material. The ratings are based on the soil properties that affect erosion and stability of the surface and the productive potential of the reconstructed soil. These properties include the content of sodium, salts, and calcium carbonate; reaction; available water capacity; erodibility; texture; content of rock fragments; and content of organic matter and other features that affect fertility.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the whole soil, from the surface to a depth of about 5 feet. It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the AASHTO classification of the soil) and linear extensibility (shrink-swell potential).

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area. The ratings are based on the soil properties that affect plant growth; the ease of excavating, loading, and spreading the material; and reclamation of the borrow area. Toxic substances, soil reaction, and the properties that are inferred from soil texture, such as available water capacity and fertility, affect plant growth. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to a water table, rock fragments, depth to bedrock or a cemented pan, and toxic material.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 16 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine particle-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties are shown in tables. They include engineering index properties, physical and chemical properties, and pertinent soil and water features.

Engineering Index Properties

Table 17 gives the engineering classifications and the range of index properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. “Loam,” for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, “gravelly.” Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of particle-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is generally omitted in the table.

Physical and Chemical Properties of the Soils

Table 18 shows estimates of some physical and chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In table 18, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $^1/_3$- or $^1/_{10}$-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability (K_{sat}) refers to the ability of a soil to transmit water or air. The term "permeability," as used in soil surveys, indicates saturated hydraulic conductivity (K_{sat}). The estimates in the table indicate the rate of water movement, in inches per hour, when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 18, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in table 18 as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of several factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Soil Features

Table 19 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness of the restrictive layer, which significantly affects the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

For *soil slippage potential,* the observation of surface slippage features that indicate a mass of soil will possibly slip when the vegetation is removed and soil water is at or near saturation or when the slope is undercut. Saturating a slope with water from altered drainage or irrigation has an effect on slippage. Soil slippage potential is an important consideration for engineering practices, such as constructing roads and buildings, and for forestry practices.

Soil slippage potential classes are estimated by observing slope; lithology, including contrasting lithologies; strike and dip; surface drainage patterns; and occurrences of such features as slip scars and slumps. The following classes are used: *high* (unstable); *medium* (moderately unstable); and *low* (slightly unstable to stable).

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low, moderate,* or *high.* It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Water Features

Table 20 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

Water table refers to a saturated zone in the soil. Table 20 indicates, by month, depth to the top *(upper limit)* and base *(lower limit)* of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. Table 20 indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(20, 22)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 21 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udult*, the suborder of the Ultisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, parasesquic, mesic Typic Hapludults.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the “Soil Survey Manual” *(21)*. Many of the technical terms used in the descriptions are defined in “Soil Taxonomy” *(20)* and in “Keys to Soil Taxonomy” *(22)*. Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

Ashe Series

Depth class: Moderately deep
Drainage class: Somewhat excessively drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Somewhat excessively drained
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock such as granite and biotite gneiss
Landscape: Low and intermediate mountains throughout the county
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Coarse-loamy, mixed, active, mesic Typic Dystrudepts

Typical Pedon

Ashe sandy loam in an area of Ashe-Cleveland-Rock outcrop complex, 15 to 30 percent slopes, very stony (fig. 16); in Buncombe County, North Carolina; from Asheville, 5.1 miles east on Interstate 240, about 12.2 miles east on Interstate 40 to Black Mountain, turn on exit #64, about 11.9 miles south on North Carolina Highway 9, about 3.2 miles southeast on Secondary Road 2796, about 0.9 mile north on a private road, 0.5 mile northeast on a logging road, 20 feet above the road near the Buncombe-Rutherford County line, in woodland; Moffitt Hill USGS topographic quadrangle; lat. 35 degrees 30 minutes 47 seconds N. and long. 82 degrees 14 minutes 00 seconds W.; NAD 27:

Oe—0 to 2 inches; moderately decomposed organic mat.

A1—2 to 5 inches; very dark gray (10YR 3/1) sandy loam, dark yellowish brown (10YR 4/4) dry; weak fine granular structure; very friable; many very fine and fine and few medium roots; few very fine and fine pores; few fine flakes of mica; 15 percent by volume gravel and 5 percent cobbles; very strongly acid; clear smooth boundary.

A2—5 to 7 inches; very dark grayish brown (10YR 3/2) gravelly fine sandy loam, dark yellowish brown (10YR 4/4) dry; weak fine granular structure; very friable; many very fine and fine and few medium roots; few very fine and fine tubular pores; few very fine and fine flakes of mica; 15 percent by volume gravel and 5 percent cobbles; very strongly acid; clear smooth boundary.

Bw1—7 to 23 inches; dark yellowish brown (10YR 4/6) gravelly sandy loam; weak fine subangular blocky structure; friable; few fine and medium and common coarse roots; few very fine, fine, and medium pores; few very fine and fine flakes of mica; 15 percent by volume gravel and 5 percent cobbles; very strongly acid; gradual wavy boundary.

BC—23 to 29 inches; yellowish brown (10YR 5/4); gravelly sandy loam; weak medium subangular blocky structure; friable; few medium and coarse roots; few very fine tubular pores; few fine flakes of mica; 20 percent by volume gravel and 5 percent cobbles; very strongly acid; gradual wavy boundary.

Cr—29 to 34 inches; weathered, strongly cemented biotite gneiss with high excavation

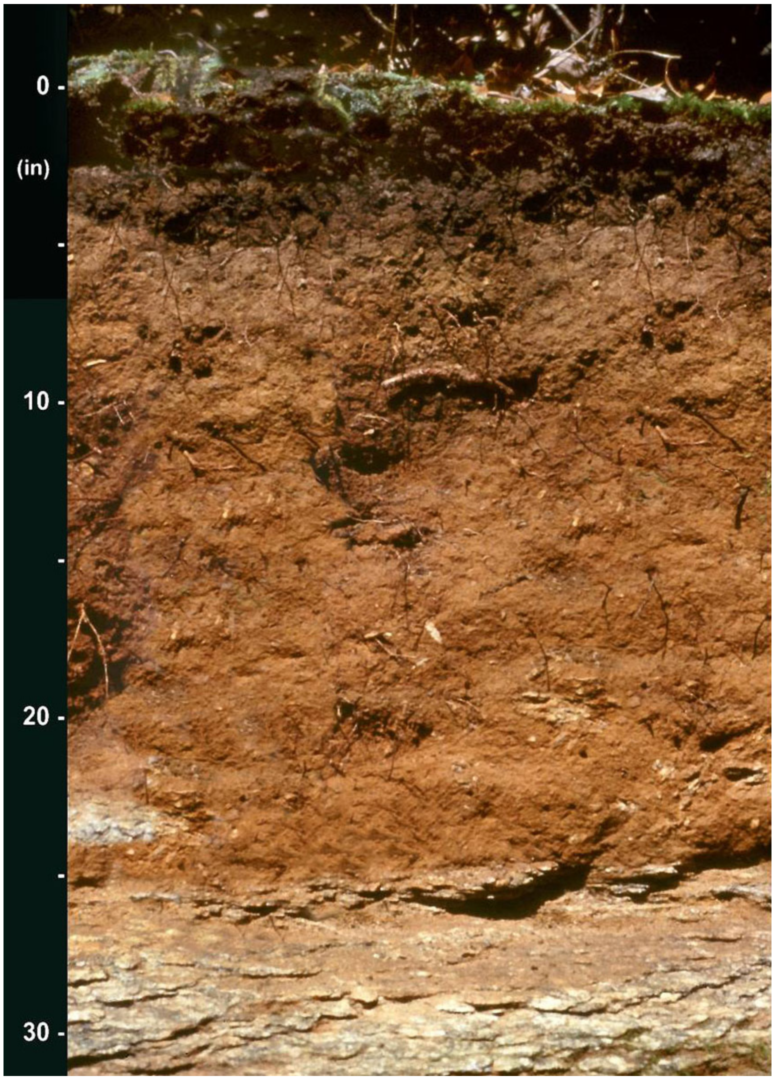

Figure 16.—Typical profile of Ashe sandy loam. Ashe soils are moderately deep to unweathered, hard bedrock. They occur on low or intermediate mountains throughout Madison County.

difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart; abrupt smooth boundary.

R—34 to 80 inches; unweathered; hard biotite gneiss bedrock.

Range in Characteristics

Solum thickness: 14 to 40 inches
Depth to bedrock: 20 to 40 inches to hard bedrock
Content of mica flakes: Few or common
Rock fragments (content, size): 5 to 35 percent by volume; dominantly gravel, but includes cobbles and stones
Soil reaction: Extremely acid to moderately acid throughout the profile

A horizon:
Color—hue of 7.5YR to 2.5Y, value of 2 to 6, and chroma of 1 to 6; where value is 3 or less, the A horizon is less than 7 inches thick

Texture (fine-earth fraction)—fine sandy loam, sandy loam, loam, or coarse sandy loam

Bw horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—sandy loam, coarse sandy loam, fine sandy loam, or loam

BC horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—sandy loam, coarse sandy loam, fine sandy loam, loam, loamy sand, or loamy fine sand

C horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8; horizon may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—loamy coarse sand, loamy sand, loamy fine sand, coarse sandy loam, sandy loam, fine sandy loam, or loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, felsic or mafic high-grade metamorphic or igneous rock; moderate or high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:
Type of bedrock—unweathered, hard, felsic or mafic high-grade metamorphic or igneous rock; very high or extremely high excavation difficulty

Biltmore Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: 3.5 to 6.0 feet from December through May and 4.0 to 6.5 feet from June through November
Permeability: Rapid
Parent material: Recent sandy alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountain valleys, dominantly on the Ivy, Shelton Laurel, and Spring Creeks and the French Broad River
Landform: Flood plains
Landform position: Planar to slightly convex bottomland slopes
Slope range: 0 to 3 percent
Taxonomic classification: Mixed, mesic Typic Udipsamments

Typical Pedon

Biltmore loamy sand, 0 to 3 percent slopes, occasionally flooded; in Buncombe County, North Carolina (fig. 17); from Asheville, 3.8 miles east on Interstate 240 West to Exit 1B (Brevard Road, North Carolina Highway 191), 1.7 miles south on North Carolina Highway 191, about 0.5 mile southeast on Biltmore Estate farm road, 1.5 miles northeast (left at barn) on Long Valley farm road to the French Broad River, 0.1 mile east along the farm road, 240 feet south in a cultivated field; Asheville USGS topographic quadrangle; lat. 35 degrees 32 minutes 39.2 seconds N. and long. 82 degrees 34 minutes 23.9 seconds W.; NAD 27:

Ap—0 to 8 inches; dark yellowish brown (10YR 4/4) loamy sand, pale brown (10YR 6/3) dry; few medium distinct brownish yellow (10YR 6/6) mottles; weak fine granular structure; very friable; many very fine, fine, and medium roots throughout;

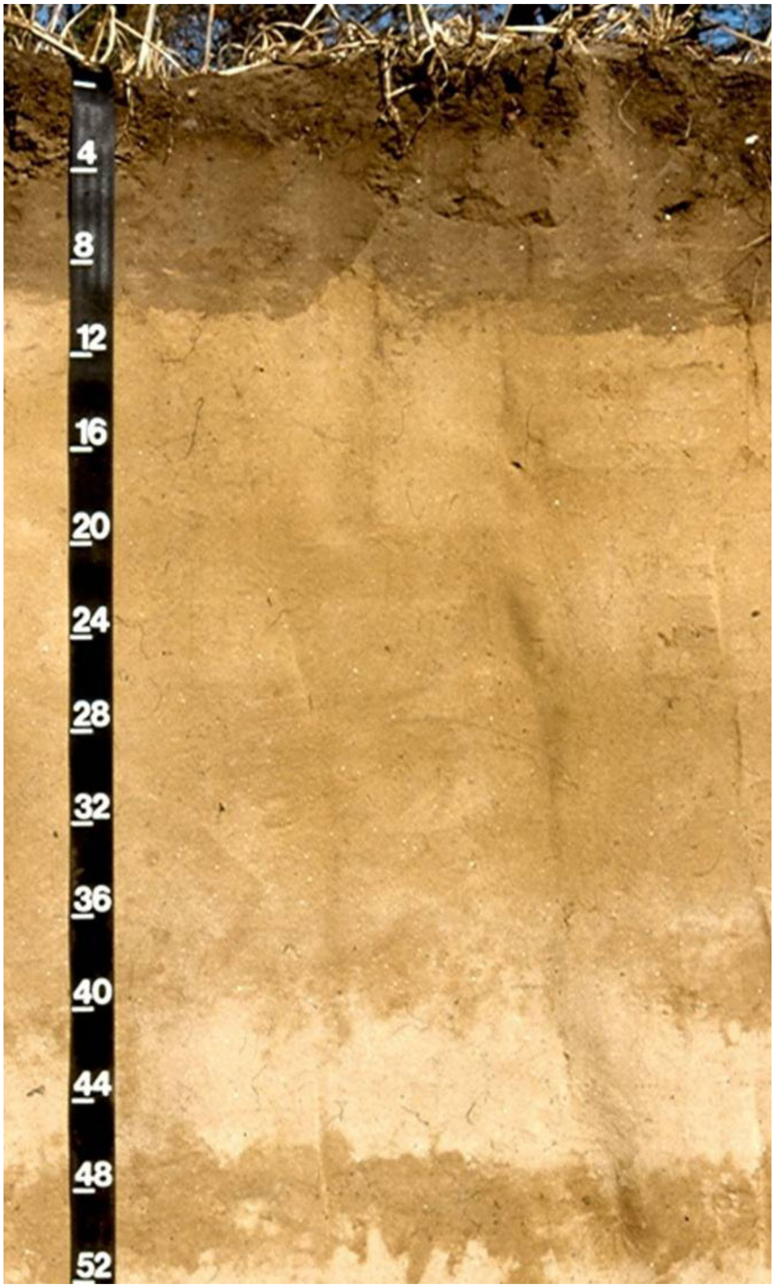

Figure 17.—Typical profile of Biltmore loamy sand. Biltmore soils are very deep and formed from material deposited by streams and consisting mainly of sand. They occur predominantly on large flood plains throughout Madison County.

few fine interstitial pores; common very fine and fine flakes of mica; slightly acid; abrupt smooth boundary.

C1—8 to 16 inches; brownish yellow (10YR 6/6) sand; few medium distinct very pale brown (10YR 7/3) mottles; single grain; loose; few very fine, fine, and medium roots; few fine interstitial and tubular pores; few fine black (10YR 2/1) charcoal stains; common very fine and fine flakes of mica; slightly acid; clear smooth boundary.

C2—16 to 23 inches; yellowish brown (10YR 5/6) sand; few medium faint yellowish brown (10YR 5/4) mottles; single grain; loose; few very fine and fine roots throughout; few fine interstitial and tubular pores; few fine black (10YR 2/1) charcoal stains; common very fine and fine flakes of mica; slightly acid; clear smooth boundary.

C3—23 to 26 inches; light yellowish brown (10YR 6/4) sand; single grain; loose; few fine interstitial and tubular pores; common very fine and fine flakes of mica, moderately acid; abrupt smooth boundary.

C4—26 to 41 inches; yellowish brown (10YR 5/6), dark yellowish brown (10YR 4/4), and light yellowish brown (10YR 6/4) sand; few fine faint brown (10YR 5/3) mottles; single grain; loose; few very fine and fine flakes of mica; slightly acid; clear smooth boundary.

C5—41 to 47 inches; dark yellowish brown (10YR 4/6) fine sand; few medium distinct light yellowish brown (10YR 6/4) and few fine prominent strong brown (7.5YR 5/6) mottles; single grain; loose; few fine black (10YR 2/1) charcoal; common very fine and fine flakes of mica; slightly acid; clear smooth boundary.

C6—47 to 53 inches; dark yellowish brown (10YR 4/6), light yellowish brown (10YR 6/4), and strong brown (7.5YR 4/6) sand; single grain; loose; common very fine and fine flakes of mica; slightly acid; clear smooth boundary.

C7—53 to 80 inches; brown (10YR 5/3) and dark yellowish brown (10YR 4/4) fine sand; few fine distinct strong brown (7.5YR 4/6) mottles; single grain; loose; common very fine and fine flakes of mica; slightly acid.

Range in Characteristics

Depth to contrasting material: 40 to more than 60 inches to deposits of cobbles and gravel, stratified with sandy or loamy material
Depth to bedrock: More than 60 inches
Content of mica flakes: Few to many
Rock fragments (content, size): 0 to 10 percent by volume to a depth of 40 inches and variable below 40 inches; dominantly gravel or cobbles
Soil reaction: Strongly acid to slightly alkaline throughout the profile

A, Ab, and Ap horizons:
Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 1 to 6; where value is 3 or less, the A horizon is less than 10 inches thick
Texture—loamy sand, sandy loam, fine sandy loam, loamy fine sand, or sand

Bw horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 6 to 8
Texture—sand, loamy sand, or loamy fine sand

C horizon (to a depth of 40 inches):
Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8
Texture—sand, loamy sand, or loamy fine sand alluvium

C horizon (below a depth of 40 inches):
Color—hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 1 to 6
Redoximorphic features (if they occur)—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture—sand, fine sand, loamy sand, or loamy fine sand alluvium or stratified with layers of cobbles, gravel, or loamy alluvium

Braddock Series

Depth class: Very deep
Drainage class: Well drained

Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Parent material: Old alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Low mountains, dominantly in the Hot Springs, Mars Hill, and Spring Creek parts of the county
Landform: High stream terraces
Landform position: Benches
Slope range: 2 to 30 percent
Taxonomic classification: Fine, mixed, semiactive, mesic Typic Hapludults

Typical Pedon

Braddock clay loam, 8 to 15 percent slopes, moderately eroded; in Buncombe County, North Carolina (fig. 18); from Asheville, 4.9 miles west on Interstate 240, about 1.7 miles east on Interstate 26 to exit #2, about 0.4 mile south on North Carolina Highway 191 (Brevard Road), 1.8 miles north on North Carolina Highway 112, about 0.1 mile northeast on a farm road to a borrow area, 50 feet southeast under a power transmission line, in a pasture; Enka USGS topographic quadrangle; lat. 35 degrees 32 minutes 27 seconds N. and long. 82 degrees 37 minutes 52 seconds W.; NAD 27:

Ap1—0 to 3 inches; dark brown (7.5YR 3/4) clay loam, brown (7.5YR 5/3) dry; moderate fine granular structure; very friable; many very fine and fine and common medium roots; many medium tubular pores; few very fine flakes of mica; 3 percent by volume subangular quartz gravel and cobbles; slightly acid; clear smooth boundary.

Ap2—3 to 9 inches; brown (7.5YR 4/4) clay loam, light brown (7.5YR 6/4) dry; fine medium distinct yellowish red (5YR 4/6) mottles; weak fine granular structure; very friable; many very fine and fine and common medium roots; common fine and many medium tubular pores; few very fine flakes of mica; 3 percent by volume subangular quartz gravel and cobbles; slightly acid; clear smooth boundary.

BA—9 to 15 inches; yellowish red (5YR 4/6) clay loam; few fine prominent brown (7.5YR 5/2) mottles along root channels and common medium distinct red (2.5YR 4/6) mottles; moderate medium granular structure; friable; slightly sticky, slightly plastic; common very fine and fine roots; common fine and medium tubular pores; few discontinuous faint yellowish red (5YR 5/6) clay films on faces of peds; few very fine flakes of mica; 4 percent by volume subangular quartz gravel and cobbles; moderately acid; gradual wavy boundary.

Bt1—15 to 37 inches; red (10R 5/6) clay; few medium distinct red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; firm; sticky and plastic; common very fine and fine roots; common fine and medium tubular pores; common continuous distinct red (2.5YR 4/6) clay films on faces of peds; few very fine mica; 4 percent by volume rounded quartz gravel cobbles; strongly acid; gradual wavy boundary.

Bt2—37 to 54 inches; red (2.5YR 4/6) clay; few medium distinct red (10R 5/6), few fine distinct yellowish red (5YR 5/6), and few medium prominent reddish yellow (7.5YR 6/6) mottles; moderate medium subangular blocky structure; firm; sticky and plastic; few very fine and fine roots; common fine and few coarse tubular pores; few discontinuous faint red (2.5YR 5/6) clay films on faces of peds; few fine flakes of mica; 4 percent by volume rounded quartz gravel and cobbles; strongly acid; gradual wavy boundary.

BC—54 to 71 inches; red (2.5YR 4/6) sandy clay loam; few medium distinct red (10R 5/6) mottles; weak medium subangular blocky structure; friable; few very fine roots; common fine and few medium tubular pores; few patchy faint yellowish red (5YR

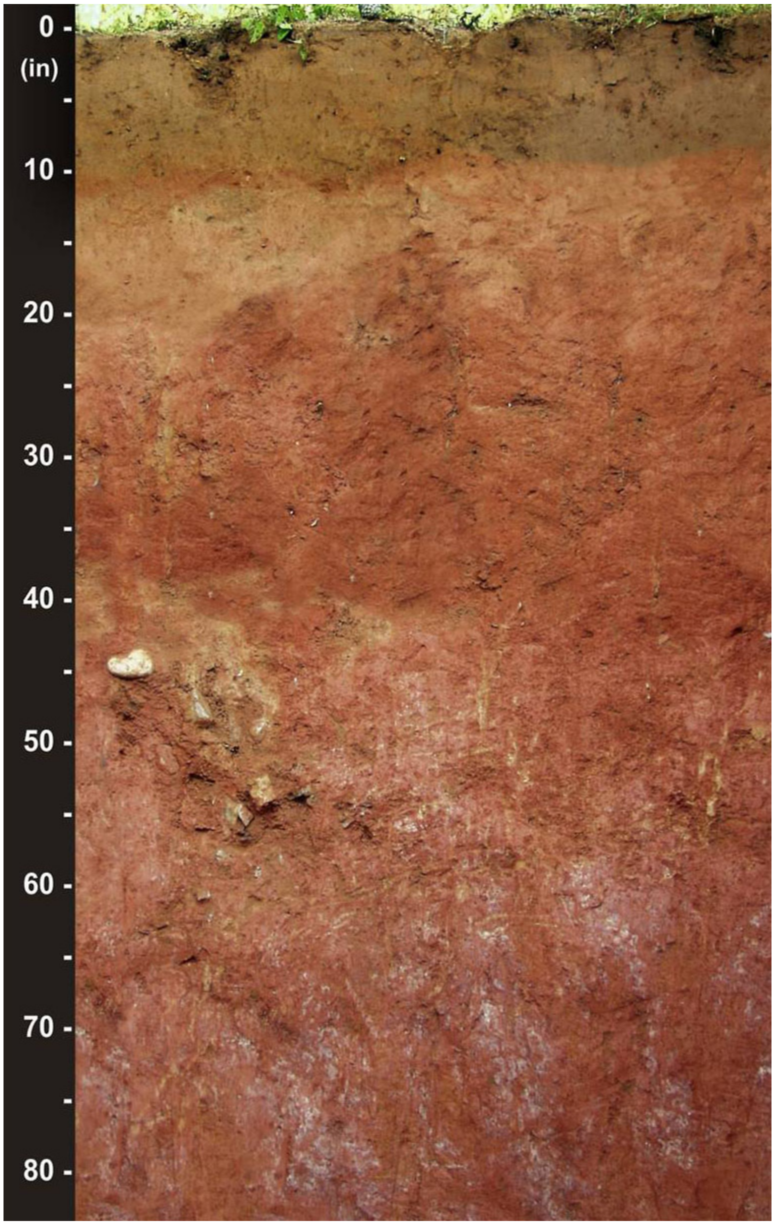

Figure 18.—Typical profile of Braddock clay loam. Braddock soils are very deep and formed from old alluvial deposits. They occur on intermountain hills and low mountains predominantly in the north-central part of Madison County.

4/6) clay films on faces of peds; few common and medium flakes of mica; 12 percent by volume rounded quartz gravel and cobbles; strongly acid.

2C—71 to 83 inches; red (2.5YR 4/8) sandy loam; massive; friable; common fine and medium flakes of mica; strongly acid.

Range in Characteristics

Solum thickness: 40 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few to many
Rock fragments (content, size): Less than 15 percent by volume in the A, Ap, and BA

horizons and the upper Bt horizon; less than 60 percent in the lower Bt horizon and in the C horizon; dominantly gravel or cobbles

Soil reaction: Extremely acid to strongly acid throughout the profile, except where surface layers have been limed

Ap horizon:
- Color—hue of 5YR to 10YR, value of 2 to 5, and chroma of 2 to 6; where value is 3 or less, the A horizon is less than 7 inches thick
- Texture (fine-earth fraction)—clay loam, loam, sandy loam, or fine sandy loam; sandy clay loam, or silty clay loam in eroded pedons

BA horizon:
- Color—hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 4 to 8
- Texture (fine-earth fraction)—clay loam, sandy clay loam, or clay

Bt horizon:
- Color—hue of 10R or 2.5YR, value of 3 to 5, and chroma of 6 to 8; some pedons have subhorizons with hue of 5YR
- Texture (fine-earth fraction)—clay, clay loam, or sandy clay

BC horizon:
- Color—hue of 10R or 2.5YR, value of 3 to 5, and chroma of 6 or 8; some pedons have subhorizons with hue of 5YR
- Texture (fine-earth fraction)—sandy clay loam, clay loam, sandy clay, or clay

2C or C horizon (if it occurs):
- Color—hue of 2.5YR to 7.5YR, value of 4 to 8, and chroma of 3 to 6
- Texture (fine-earth fraction)—sandy loam, fine sandy loam, loam, sandy clay loam, or clay loam; some pedons have sandy, gravelly, and cobbly substrata

Brasstown Series

Depth class: Deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock such as metasandstone or metaconglomerate
Landscape: Low and intermediate mountains, dominantly in the Shelton Laurel, Shut-in Creek, and Walnut communities
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Fine-loamy, mixed, subactive, mesic Typic Hapludults

Typical Pedon

Brasstown loam in an area of Junaluska-Brasstown complex, 15 to 30 percent slopes; in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 10.5 miles north on U.S. Highway 25 & 70 to Hurricane, 4.1 miles north on North Carolina Highway 208 to Belva, 8.1 miles northeast on North Carolina Highway 212 to Hickey Fork, 1.2 miles northwest on Secondary Road 1310 to East Prong Hickey Fork, 1.8 miles northeast on U.S. Forest Service Road 465, about 0.4 mile north on U.S. Forest Service Road 293 along East Prong Hickey Fork, 0.75 mile west on Whiteoak Flat Trail, 75 feet northwest of the trail on a forested side slope; Greystone USGS topographic quadrangle; lat. 36 degrees 00 minutes 54 seconds N. and long. 82 degrees 42 minutes 12 seconds W.; NAD 27:

Oe—0 to 2 inches; moderately decomposed organic mat.

A—2 to 4 inches; dark brown (7.5YR 3/2) loam, brown (7.5YR 5/3) dry; weak fine granular structure; very friable; common very fine and fine and few medium and coarse roots; many very fine and fine tubular pores; few fine flakes of mica; 8 percent by volume gravel; very strongly acid; clear smooth boundary.

BA—4 to 10 inches; reddish brown (5YR 4/4) loam; weak fine subangular blocky structure; friable; common very fine and fine and medium roots; common very fine to medium tubular pores; few fine flakes of mica; 8 percent by volume channers; very strongly acid; clear smooth boundary.

Bt1—10 to 24 inches; red (2.5YR 4/6) clay loam; few fine prominent brownish yellow (10YR 6/8) and common medium prominent dark yellowish brown (10YR 4/6) mottles; moderate medium subangular blocky structure; friable; common fine and medium and few coarse roots; common fine and medium tubular pores; common faint clay films on faces of peds; common distinct clay bridges between sand grains; few fine flakes of mica; 12 percent by volume channers; very strongly acid; clear wavy boundary.

Bt2—24 to 39 inches; yellowish red (5YR 4/6) channery loam; common medium prominent strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; few fine and medium tubular pores; common faint clay films on faces of peds; common distinct clay bridges between sand grains; few fine irregular black (5YR 2.5/1) manganese stains throughout; few fine flakes of mica; 18 percent by volume channers; very strongly acid; gradual wavy boundary.

BC—39 to 48 inches; red (2.5YR 4/6) channery loam; common medium prominent strong brown (7.5YR 5/6), fine medium distinct yellowish red (5YR 4/6), and few fine prominent dark yellowish brown (10YR 4/6) mottles; weak coarse subangular blocky structure; friable; few very fine roots; few very fine to medium tubular pores; few fine irregular black (5YR 2.5/1) manganese stains throughout; few distinct dark yellowish brown (10YR 4/4) clay films on surfaces of rock fragments; few fine flakes of mica; 20 percent by volume channers; very strongly acid; gradual irregular boundary.

Cr—48 to 80 inches; weathered, strongly cemented metasandstone with high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 26 to 59 inches
Depth to bedrock: 40 to 60 inches to weathered bedrock
Content of mica flakes: None or few
Rock fragments (content, size): Less than 35 percent by volume; dominantly gravel or channers but ranging to stones in the C horizon
Soil reaction: Extremely acid to moderately acid throughout the profile

A or Ap horizon:
Color—hue of 10YR to 5YR, value of 2 to 5, and chroma of 2 to 8; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—loam, fine sandy loam, very fine sandy loam, or silt loam

BA horizon:
Color—hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—loam, fine sandy loam, very fine sandy loam, or sandy clay loam

Bt horizon:
Color—hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8; at least part of the horizon has hue 2.5YR or 5YR
Texture (fine-earth fraction)—clay loam, loam, or sandy clay loam

BC horizon:
Color—hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—loam, fine sandy loam, very fine sandy loam, or sandy clay loam

C or CB horizon (if it occurs):
Color—horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8, or it is mixed or mottled in shades of these colors
Texture (fine-earth fraction)—fine sandy loam, very fine sandy loam, sandy loam, or loam saprolite
Other characteristics—thin parallel layers of saprolite and Bt horizon material may occur along fracture planes

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, low-grade metasedimentary rock with moderate or high excavation difficulty
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Buladean Series

Depth class: Deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock such as granite and biotite gneiss
Landscape: Low and intermediate mountains, dominantly in the western and eastern parts of the county
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Coarse-loamy, mixed, active, mesic Typic Dystrudepts

Typical Pedon

Buladean fine sandy loam in an area of Buladean-Chestnut complex, 30 to 50 percent slopes, stony; in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 16.5 miles northeast on U.S. Highway 25 & 70 to Hot Springs, 8.2 miles south on North Carolina Highway 209 (just south of Bluff), 6.1 miles southwest on Secondary Road 1175 to Joe, 4.1 miles west on Secondary Road 1181 to Little Creek Gap on the Haywood County line, 5.8 miles northeast on Secondary Road 1182 to Lemon Gap on the Tennessee State line, 2.35 miles northeast from an iron gate on U.S. Forest Service Road 3505, about 150 feet east of the road on a forested side slope; Lemon Gap USGS topographic quadrangle; lat. 35 degrees 49 minutes 49 seconds N. and long. 82 degrees 55 minutes 20 seconds W.; NAD 27:

Oe—0 to 1 inch; moderately decomposed organic mat.
A—1 to 4 inches; dark yellowish brown (10YR 3/4) fine sandy loam, yellowish brown (10YR 5/4) dry; weak fine granular structure; very friable; many very fine and fine,

common medium, and few coarse roots; many very fine to medium and common coarse tubular pores; 4 percent by volume gravel; strongly acid; clear smooth boundary.

Bw1—4 to 22 inches; yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; very friable; common very fine to medium and few coarse roots; common very fine to medium and few coarse tubular pores; few fine flakes of mica; 4 percent by volume gravel; strongly acid; gradual wavy boundary.

Bw2—22 to 38 inches; brownish yellow (10YR 6/6) sandy loam; weak medium subangular blocky structure; friable; common very fine to medium and few coarse roots; common very fine to medium and few coarse tubular pores; few very fine flakes of mica; 4 percent by volume gravel; strongly acid; gradual wavy boundary.

BC—38 to 45 inches; yellowish brown (10YR 5/6) gravelly sandy loam; weak fine subangular blocky structure; friable; common very fine to coarse roots; common very fine to coarse tubular pores; few very fine flakes of mica; 3 percent by volume gravel; very strongly acid; gradual wavy boundary.

C—45 to 52 inches; light yellowish brown (10YR 6/4) gravelly loamy sand saprolite; massive; very friable; few medium roots; few very fine to coarse tubular pores; few very fine flakes of mica; 20 percent by volume gravel; very strongly acid; gradual irregular boundary.

Cr—52 to 80 inches; weathered, strongly cemented Max Patch granite with high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 20 to 40 inches
Depth to bedrock: 40 to 60 inches to weathered bedrock
Content of mica flakes: Few or common
Rock fragments (content, size): Less than 35 percent by volume; dominantly gravel
Soil reaction: Extremely acid to moderately acid throughout the profile

A or Ap horizon:
Color—hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 4; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

Bw horizon:
Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

BC horizon:
Color—horizon has hue of 7.5YR to 2.5Y, value of 4 to 8, and chroma of 1 to 6, or it is mixed or mottled in shades of these colors; colors with chroma of 2 or less are inherited from the parent material and are not caused by wetness
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam; some pedons have pockets of loamy sand or sandy loam saprolite

C horizon:
Color—horizon has hue of 5YR to 2.5Y, value of 3 to 8, and chroma of 1 to 8, or it is mixed or mottled in shades of these colors; colors with chroma of 2 or less are inherited from the parent material and are not caused by wetness
Texture (fine-earth fraction)—loamy sand or sandy loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, felsic or mafic high-grade metamorphic or igneous rock with moderate or high excavation difficulty

Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Burton Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from granite
Landscape: High mountains on Max Patch Mountain
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Slope range: 8 to 95 percent
Taxonomic classification: Fine-loamy, isotic, frigid Humic Dystrudepts

Typical Pedon

Burton loam in an area of Wayah-Burton complex, windswept, 30 to 50 percent slopes, bouldery; in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 16.5 miles northeast on U.S. Highway 25 & 70 to Hot Springs, 8.2 miles south on North Carolina Highway 209 (just south of Bluff), 6.1 miles southwest on Secondary Road 1175 to Joe, 4.1 miles west on Secondary Road 1181 to Little Creek Gap on the Haywood County line, 1.6 miles north on Secondary Road 1182 along the Tennessee State line to the Max Patch trail head on Appalachian Trail, approximately 0.3 mile northeast of U.S. Forest Service parking lot in a grassy bald; Lemon Gap USGS topographic quadrangle; lat. 35 degrees 47 minutes 49.7 seconds N. and long. 82 degrees 57 minutes 29.1 seconds W.; NAD 27:

Oe—0 to 1 inch; moderately decomposed organic mat.
A1—1 to 4 inches; very dark brown (10YR 2/2) loam, dark brown (10YR 3/3) dry; weak fine granular structure; very friable; many very fine to coarse roots throughout the horizon; 8 percent gravel and cobbles and 3 percent stones by volume; common very fine and fine interstitial pores; few very fine and fine flakes of mica; very strongly acid; clear smooth boundary.
A2—4 to 12 inches; very dark grayish brown (10YR 3/2) loam, brown (10YR 4/3) dry; weak medium and coarse subangular structure; very friable; common very fine to coarse roots; 10 percent gravel and cobbles by volume; few very fine and fine vesicular pores; few very fine and fine flakes of mica; very strongly acid; clear smooth boundary.
Bw—12 to 27 inches; dark yellowish brown (10YR 4/6) sandy loam; weak medium and coarse subangular blocky structure; very friable; few very fine and fine roots; 11 percent gravel and cobbles by volume; many very fine and fine vesicular pores; few very fine and fine flakes of mica; very strongly acid; clear smooth boundary.
Cr—27 to 31 inches; weathered, strongly cemented Max Patch granite with high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart; abrupt smooth boundary.
R—31 to 80 inches; unweathered, hard Max Patch granite bedrock.

Range in Characteristics

Solum thickness: 20 to 40 inches
Depth to bedrock: 20 to 40 inches to hard bedrock
Content of mica flakes: Few or common in the A and B horizons and few to many in the C horizon

Rock fragments (content, size): Less than 35 percent by volume in the A and B horizons and less than 50 percent in the C horizon; including gravel, cobbles, and stones
Soil reaction: Extremely acid to moderately acid throughout the profile

A horizon:
Color—horizon has hue of 5YR to 2.5Y, value of 2 or 3, and chroma of 1 to 3, or it is neutral in hue and has value of 4
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, sandy clay loam, or clay loam
Thickness—10 to 20 inches

Bw horizon:
Color—hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

C horizon (if it occurs):
Color—horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 3 to 8, and it may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—loamy sand, loamy fine sand, sandy loam, fine sandy loam, or loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, felsic igneous rock (Max Patch granite); moderate or high excavation difficulty
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:
Type of bedrock—unweathered, hard, felsic igneous rock (Max Patch granite); very high or extremely high excavation difficulty

Calvin Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from sedimentary rock such as red to brown siltstone or shale
Landscape: Intermountain hills in the Lower Shut-in Creek, Antioch, and Shaleville parts of the county
Landform: Ridges and hillslopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Loamy-skeletal, mixed, active, mesic Typic Dystrudepts

Typical Pedon

Calvin channery silt loam, 30 to 50 percent slopes; in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 18.1 miles northeast on U.S. Highway 25 & 70 west of Hot Springs, 350 feet north-northeast on a paved access road near a Department of Transportation equipment shed, 750 feet north of the road on a forested side slope; Hot Springs USGS topographic quadrangle; lat. 35 degrees 54 minutes 09 seconds N. and long. 82 degrees 50 minutes 52 seconds W.; NAD 27:

Oe—0 to 1 inch; moderately decomposed organic mat.

A—1 to 9 inches; reddish brown (5YR 4/3) channery silt loam, pinkish gray (5YR 6/2) dry; weak fine granular structure; friable; many very fine to medium and few or common coarse and very coarse roots throughout; common fine to medium tubular pores; 20 percent by volume siltstone channers; very strongly acid; clear smooth boundary.
Bw—9 to 18 inches; reddish brown (2.5YR 4/4) channery silt loam; weak medium subangular blocky structure; friable; common very fine to medium and few coarse roots throughout; few fine and medium tubular pores; 25 percent by volume siltstone channers; very strongly acid; gradual wavy boundary.
BC—18 to 27 inches; reddish brown (2.5YR 5/4) very channery silt loam; weak fine subangular blocky structure; friable; few very fine to medium roots throughout; 40 percent by volume very angular siltstone channers; very strongly acid; gradual wavy boundary.
C—27 to 36 inches; reddish brown (2.5YR 4/3) extremely channery loam saprolite; massive; very friable; few very fine and fine roots in cracks; 70 percent by volume angular siltstone channers and flagstones; discontinuous silt coatings on rock fragments; very strongly acid; gradual wavy boundary.
Cr—36 to 80 inches; weathered, strongly cemented siltstone with high excavation difficulty; few thin seams of dark yellowish brown (10YR 4/6) loam in cracks; few roots in cracks that are spaced more than 4 inches apart; strongly acid.

Range in Characteristics

Solum thickness: 12 to 35 inches
Depth to bedrock: 20 to 40 inches
Content of mica flakes: None
Rock fragments (content, size): Less than 25 percent by volume in the A and BA horizons, 25 to 55 percent in the Bw and BC horizons, and 40 to 80 percent in the C horizon; dominantly channers and flagstones
Soil reaction: Very strongly acid to moderately acid throughout the profile

A or Ap horizon:
Color—hue of 5YR or 7.5YR, value of 2 to 5, and chroma of 2 to 4; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—silt loam or loam

BA horizon (if it occurs):
Color—hue of 10R to 5YR, value of 4 or 5, and chroma of 2 to 8
Texture (fine-earth fraction)—silt loam or loam

Bw horizon:
Color—hue of 10R to 5YR, value of 4 or 5, and chroma of 2 to 8
Texture (fine-earth fraction)—silt loam or loam

BC horizon:
Color—hue of 10R to 5YR, value of 4 or 5, and chroma of 2 to 8
Texture (fine-earth fraction)—silt loam or loam

C horizon:
Color—hue of 10R to 5YR, value of 3 to 5, and chroma of 2 to 4
Texture (fine-earth fraction)—loam or silt loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, sedimentary rock (siltstone and shale); moderate or high excavation difficulty
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Cataloochee Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate in the surface layer and moderately rapid the subsoil and underlying material
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock such as slate, phyllite, and thinly bedded metasandstone
Landscape: High mountains at Sandymush Bald
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Slope range: 8 to 95 percent
Taxonomic classification: Fine-loamy, isotic, frigid Humic Dystrudepts

Typical Pedon

Cataloochee clay loam in an area of Oconaluftee-Guyot-Cataloochee complex, windswept, 15 to 30 percent slopes, bouldery; in Haywood County, North Carolina; from Waynesville, 1.0 mile north of Main Street on U.S. Highway 276, about 7.5 miles southwest on U.S. Highway 23 & 74, about 0.65 mile northwest on the Blue Ridge Parkway entrance road at Balsam Gap on the Haywood-Jackson County line, 14.9 miles south on the Blue Ridge Parkway to Wolf Laurel Gap, 6.2 miles north on Balsam Mountain Road (Blue Ridge Parkway Extension) in the Great Smoky Mountains National Park to the Polls Gap trail head, 250 feet southeast of a parking area, on a forested summit; Bunches Bald USGS topographic quadrangle; lat. 35 degrees 33 minutes 44.1 seconds N. and long. 83 degrees 09 minutes 39.2 seconds W.; NAD 27:

Oe—0 to 2 inches; moderately decomposed organic litter and root mat.
A1—2 to 4 inches; black (10YR 2/1) clay loam, dark brown (10YR 3/3) dry; weak moderate fine and medium granular structure; very friable; many fine to very coarse roots throughout; common very fine and fine interstitial pores; few fine flakes of mica; 5 percent metasandstone channers by volume; ultra acid; clear smooth boundary.
A2—4 to 9 inches; very dark brown (10YR 2/2) clay loam, brown (10YR 4/3) dry; moderate fine and medium granular structure; very friable; common fine and many medium to very coarse roots throughout; few very fine and fine vesicular pores; few fine flakes of mica; 12 percent metasandstone channers by volume; ultra acid; clear wavy boundary.
Bw1—9 to 13 inches; dark yellowish brown (10YR 4/6) loam; weak medium and coarse subangular blocky structure; friable; common very fine and fine and few medium and coarse roots throughout; few very fine and fine vesicular pores; few fine flakes of mica; 10 percent metasandstone channers by volume; extremely acid; clear smooth boundary.
Bw2—13 to 19 inches; dark yellowish brown (10YR 4/6) channery loam; weak medium and coarse subangular blocky structure; friable; few very fine, fine, and medium roots throughout; 20 percent metasandstone channers by volume; few very fine and fine vesicular pores; few fine flakes of mica; very strongly acid; clear smooth boundary.
BC—19 to 25 inches; dark yellowish brown (10YR 4/4) channery sandy loam; weak medium and coarse subangular blocky structure; friable; few very fine and fine roots throughout; few very fine and fine vesicular pores; few fine flakes of mica; 30 percent metasandstone channers by volume; very strongly acid; clear wavy boundary.
C—25 to 31 inches; dark yellowish brown (10YR 4/6) channery fine sandy loam;

massive; very friable; few fine flakes of mica; 25 percent metasandstone channers by volume; very strongly acid; clear wavy boundary.

Cr—31 to 80 inches; weathered, strongly cemented metasandstone with high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 20 to 40 inches
Depth to bedrock: 20 to 40 inches to weathered bedrock
Content of mica flakes: None or few
Rock fragments (content, size): Less than 35 percent by volume; dominantly channers
Soil reaction: Ultra acid to strongly acid throughout the profile

A horizon:
Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—clay loam, fine sandy loam, or loam
Thickness—10 to 20 inches

AB horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4
Texture (fine-earth fraction)—clay loam, fine sandy loam, or loam

Bw horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam

BC horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

C horizon:
Color—horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 3 to 8, and it may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—fine sandy loam, sandy loam, loamy fine sand, or loamy sand saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, low-grade metasedimentary rock; moderate or high excavation difficulty
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Cataska Series

Depth class: Shallow
Drainage class: Excessively drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock such as slate, phyllite, metasiltstone, and thinly bedded metasandstone
Landscape: Low and intermediate mountains in the northwestern and north-central parts of the county
Landform: Ridges and south-to-west facing mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent

Taxonomic classification: Loamy-skeletal, mixed, semiactive, mesic, shallow Typic Dystrudepts

Typical Pedon

Cataska channery silt loam in an area of Sylco-Cataska complex, 30 to 50 percent slopes, very rocky; in Madison County, North Carolina; from Marshall, 10.8 miles north on U.S. Highways 25 & 70, about 5.3 miles west on U.S. Highway 25 & 70, about 6.2 miles northwest on Secondary Road 1304, about 7.2 miles northeast on U.S. Forest Service Road 468, east of the road on a forested side slope; USGS Hot Springs topographic quadrangle; lat. 35 degrees 56 minutes 02.1 seconds N. and long. 82 degrees 51 minutes 11.7 seconds W.; NAD 27:

Oe—0 to 1 inch; moderately decomposed organic mat.

A—1 to 5 inches; yellowish brown (10YR 5/4) channery silt loam, very pale brown (10YR 7/4) dry; weak fine granular structure; very friable; many very fine and fine and few medium and coarse roots; common very fine and fine discontinuous tubular pores; 25 percent by volume channers and 5 percent flagstones; very strongly acid; clear smooth boundary.

Bw—5 to 13 inches; light yellowish brown (10YR 6/4) very channery silt loam; weak fine subangular blocky structure; friable; common very fine, fine, and medium roots; common very fine and fine discontinuous tubular pores; 45 percent by volume channers and 10 percent flagstones; very strongly acid; gradual wavy boundary.

Cr—13 to 24 inches; weathered, strongly cemented interbedded slate and phyllite with high excavation difficulty; few fine and medium and few thin seams of dark yellowish brown (10YR 4/6) loam in cracks; few medium roots in cracks that are spaced more than 4 inches apart; strongly acid; gradual irregular boundary.

R—24 to 80 inches; unweathered, hard metasiltstone bedrock.

Range in Characteristics

Solum thickness: 12 to 20 inches; thickness can be difficult to determine

Depth to bedrock: 10 to 20 inches to weathered bedrock and 20 to 48 inches or more unweathered bedrock

Content of mica flakes: None

Rock fragments (content, size): 15 to 45 percent by volume in the A horizon and 35 to 80 percent in the Bw and C horizons; dominantly channers and flagstones

Soil reaction: Extremely acid to strongly acid throughout the profile

Other characteristics: Horizons below the A horizon have many fragments and can be interpreted as B or C horizons

A horizon:

Color—hue of 7.5YR or 10YR, value of 2 to 5, and chroma of 2 to 6; where value is 3 or less, the horizon is less than 7 inches thick

Texture (fine-earth fraction)—silt loam or loam

Bw horizon:

Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8; some pedons may have hue of 2.5Y, value of 4 or 5, and chroma of 4 to 6

Texture (fine-earth fraction)—silt loam or loam

C horizon (if it occurs):

Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8; some pedons may have hue of 2.5Y, value of 4 or 5, and chroma of 4 to 6

Texture (fine-earth fraction)—silt loam or loam saprolite

Cr layer:

Type of bedrock—weathered, weakly to strongly cemented, low-grade metasedimentary rock; moderate or high excavation difficulty

Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:

Type of bedrock—unweathered, hard, low-grade metasedimentary rock; very high or extremely high excavation difficulty

Cheoah Series

Depth class: Deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock such as interbedded bedded metasandstone, phyllite, or quartzite
Landscape: Low and intermediate mountains in the northeastern and Sandymush Bald areas in the southwestern part of the county
Landform: North- to east-facing ridges and mountain slopes and those shaded by higher mountains
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Fine-loamy, isotic, mesic Humic Dystrudepts

Typical Pedon

Cheoah fine sandy loam in an area of Cheoah-Jeffrey complex, 30 to 50 percent slopes, stony; in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 10.5 miles north on U.S. Highway 25 & 70 to Hurricane, 4.1 miles north on North Carolina Highway 208 to Belva, 8.1 miles northeast on North Carolina Highway 212 to Hickey Fork, 1.2 miles northwest on Secondary Road 1310 to East Prong Hickey Fork, 1.8 miles northeast on U.S. Forest Service Road 465, right on Little Prong, 2.2 miles northeast on U.S. Forest Service Road 465 to a gate at Whiteoak Flats, 0.3 mile east on U.S. Forest Service Road 290, about 0.5 mile south on U.S. Forest Service Road 288, about 0.3 mile west on a logging road, 750 feet north of the road on a forested side slope; Greystone USGS topographic quadrangle; lat. 36 degrees 01 minute 10 seconds N. and long. 82 degrees 40 minutes 24 seconds W.; NAD 27:

Oe—0 to 2 inches; partially decomposed organic litter and root mat.

A—2 to 11 inches; very dark grayish brown (10YR 3/2) fine sandy loam, brown (10YR 4/3) dry; weak fine granular structure; very friable; many fine, common medium, and few very fine roots; few fine tubular pores; 5 percent by volume metasandstone and phyllite channers; very strongly acid; clear wavy boundary.

AB—11 to 14 inches; dark brown (10YR 3/3) loam, dark yellowish brown (10YR 4/4) dry; weak fine subangular structure; very friable; many very fine and fine, common medium, and few coarse roots; few fine tubular pores; 5 percent by volume metasandstone and phyllite channers; very strongly acid; clear smooth boundary.

Bw1—14 to 29 inches; strong brown (7.5YR 4/6) loam; common distinct dark brown (10YR 3/3) organic matter staining on faces of peds; weak medium subangular blocky structure; friable; common very fine and fine and few medium roots; few fine tubular pores; few very fine and fine flakes of mica; 10 percent by volume metasandstone and phyllite channers; strongly acid; gradual wavy boundary.

Bw2—29 to 40 inches; brown (7.5YR 4/4) loam; weak medium subangular blocky structure; very friable; few very fine, fine, and medium roots; few fine tubular pores; few very fine and fine flakes of mica; 10 percent by volume metasandstone and phyllite channers; strongly acid; gradual wavy boundary.

BC—40 to 53 inches; strong brown (7.5YR 5/6) channery loam; weak medium subangular blocky structure; friable; few very fine and fine flakes of mica; 20 percent by volume metasandstone and phyllite channers; very strongly acid; gradual wavy boundary.

Cr—53 to 80 inches; weathered, strongly cemented interbedded metasandstone and phyllite with high excavation difficulty; black (7.5YR 2.5/1) iron-manganese streaks along fractures; few seams of strong brown (7.5YR 5/8) channery loam along fractures; few fine and medium roots in cracks that are spaced more than 4 inches apart; very strongly acid.

Range in Characteristics

Solum thickness: 30 to 59 inches
Depth to bedrock: 40 to 60 inches to weathered bedrock
Content of mica flakes: None or few
Rock fragments (content, size): Less than 35 percent by volume; dominantly channers and flagstones
Soil reaction: Extremely acid to moderately acid throughout the profile

A horizon:
Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—fine sandy loam, loam, or silt loam

AB or BA horizon (if it occurs):
Color—hue of 7.5YR or 10YR and value and chroma of 3 or 4
Texture (fine-earth fraction)—loam, fine sandy loam, or silt loam

Bw horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—loam, fine sandy loam, or silt loam

BC or CB horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—loam, fine sandy loam, or silt loam

C horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—loam, fine sandy loam, or silt loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, low-grade metasedimentary rock; moderate or high excavation difficulty
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Chestnut Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock such as granite and biotite gneiss

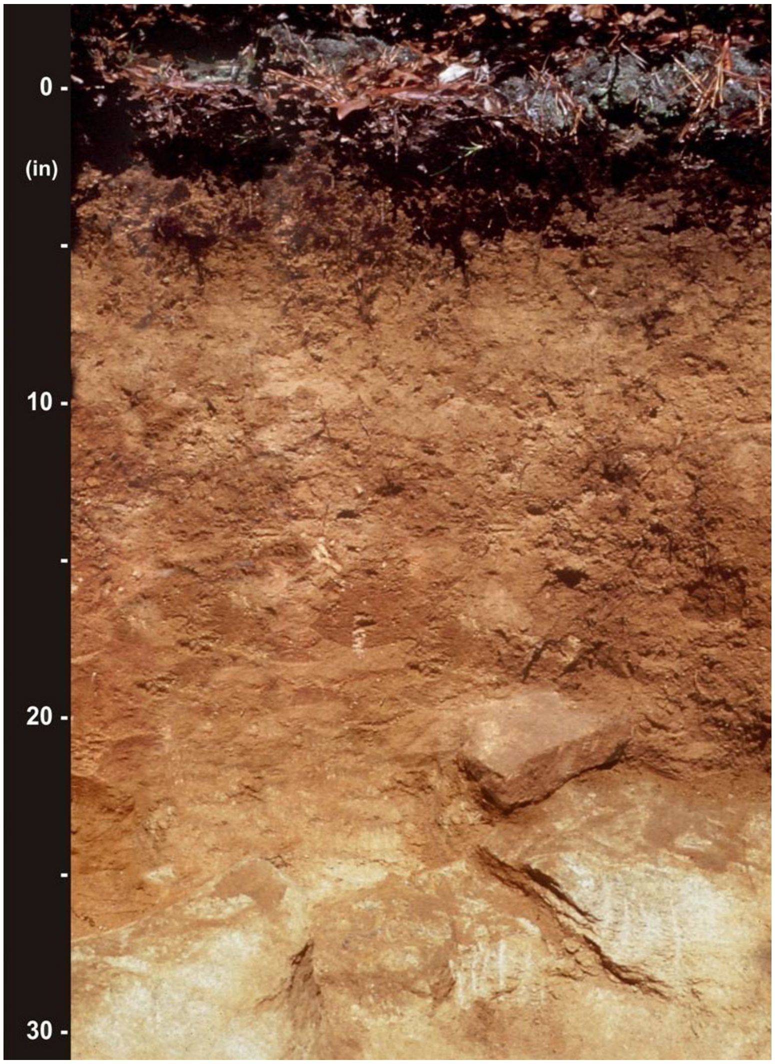

Figure 19.—Typical profile of Chestnut loam. Chestnut soils are moderately deep to weathered bedrock. They occur on low or intermediate mountains predominantly in the eastern and western parts of Madison County.

Landscape: Low and intermediate mountains, dominantly in the southwestern and southeastern parts of the county
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Coarse-loamy, mixed, active, mesic Typic Dystrudepts

Typical Pedon

Chestnut fine sandy loam in an area of Buladean-Chestnut complex, 30 to 50 percent slopes, stony (fig. 19); in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 16.5 miles northeast on U.S. Highway 25 & 70 to Hot Springs, 8.2 miles south on North Carolina Highway 209 (just south of Bluff), 6.1 miles southwest on Secondary Road 1175 to Joe, 4.1 miles west on Secondary Road 1181 to Little Creek Gap on the Haywood County line, 5.8 miles northeast on Secondary Road 1182 to Lemon Gap on the Tennessee State line, 0.2 mile northeast from an iron gate on U.S. Forest Service Road 3505 to a major curve, 600 feet east-southeast of the road on a forested side slope; Lemon Gap USGS topographic quadrangle; lat. 35 degrees 49 minutes 27 seconds N. and long. 82 degrees 55 minutes 54 seconds W.; NAD 27:

Oe—0 to 1 inch; moderately decomposed organic mat.

A—1 to 5 inches; dark brown (10YR 3/3) fine sandy loam, dark yellowish brown (10YR 4/6) dry; weak fine granular structure; very friable; many very fine and fine, common medium, and few coarse roots; many very fine and fine and common medium and coarse tubular pores; few very fine flakes of mica; 3 percent by volume gravel; strongly acid; clear wavy boundary.

BA—5 to 11 inches; dark yellowish brown (10YR 4/4) loam; weak fine subangular blocky structure; very friable; common very fine, fine, and medium and few coarse roots; common very fine to coarse tubular pores; few very fine flakes of mica; 5 percent by volume gravel; strongly acid; gradual wavy boundary.

Bw1—11 to 19 inches; yellowish brown (10YR 5/6) loam; weak medium subangular blocky structure; friable; common fine and medium and few coarse roots; common very fine to coarse tubular pores; few very fine flakes of mica; 10 percent by volume gravel and cobbles; very strongly acid; gradual wavy boundary.

Bw2—19 to 23 inches; yellowish brown (10YR 5/8) sandy loam; weak medium subangular blocky structure; friable; few medium and coarse roots; common very fine to coarse tubular pores; few very fine flakes of mica; 5 percent by volume gravel; very strongly acid; clear wavy boundary.

BC—23 to 31 inches; yellowish brown (10YR 5/4) gravelly sandy loam; weak medium subangular blocky structure; very friable; few coarse roots; few very fine to medium tubular pores; few very fine flakes of mica; 15 percent by volume gravel and cobbles; very strongly acid; gradual wavy boundary.

Cr—31 to 80 inches; weathered, strongly cemented Max Patch granite with high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 15 to 39 inches
Depth to bedrock: 20 to 40 inches to weathered bedrock
Content of mica flakes: Few or common in the A and B horizons and few to many in the C horizon
Rock fragments (content, size): 5 to less than 35 percent by volume; dominantly gravel or cobbles
Soil reaction: Extremely acid to moderately acid throughout the profile

A or Ap horizon:
Color—hue of 7.5YR to 2.5Y, value of 2 to 6, and chroma of 1 to 6; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

BA horizon:
Color—hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 3 or 4
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam

Bw horizon:
Color—hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam

BC horizon:
Color—hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

C horizon (if it occurs):
Color—horizon has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—loamy sand, loamy fine sand, sandy loam, fine sandy loam, or loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, felsic or mafic high-grade metamorphic or igneous rock; moderate or high excavation difficulty
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Chestoa Series

Depth class: Moderately deep
Drainage class: Somewhat excessively drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock such as feldspathic metasandstone, quartzite, or arkosic sandstone
Landscape: Intermediate mountains along the Tennessee State line, from Baxter Branch to Bear Creek in the northern part of the county
Landform: Ridges, north- to east-facing mountain slopes, and those slopes shaded by higher mountains
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Fine-loamy, siliceous, active, mesic Humic Dystrudepts

Typical Pedon

Chestoa sandy loam in an area of Chestoa-Ditney-Rock outcrop, 30 to 95 percent slopes, very bouldery (fig. 20); in Yancey County, North Carolina; from Burnsville, 3.5 miles west on U.S. Highway 19E, 2.0 miles west on Secondary Road 1454, about 21.3 miles west on U.S. Highway 19W, 2.2 miles north on U.S. Forest Service Road 278, north on U.S. Forest Service Road 5506 to the end of the road, 0.4 mile east at the edge of a wildlife field on Bentwoods Trail to a site 10 feet above the trail; Chestoa USGS topographic quadrangle; lat. 36 degrees 03 minutes 26 seconds N. and long. 82 degrees 24 minutes 51 seconds W.; NAD 27:

Oe—0 to 1 inch; moderately decomposed organic mat.
A1—1 to 3 inches; black (10YR 2/1) sandy loam, very dark grayish brown (10YR 3/2) dry; weak fine granular structure; very friable; common very fine and fine roots; 10 percent by volume channers; extremely acid; clear smooth boundary.
A2—3 to 8 inches; very dark brown (10YR 2/2) sandy loam, dark brown (10YR 3/3) dry; weak fine granular structure; very friable; common very fine and fine roots; 10 percent by volume channers; extremely acid; abrupt smooth boundary.
E—8 to 10 inches; grayish brown (10YR 5/2) sandy loam; weak fine granular structure; few medium and coarse roots; 5 percent by volume channers; extremely acid; abrupt smooth boundary.
Bs—10 to 13 inches; strong brown (7.5YR 4/6) sandy loam; common medium distinct dark yellowish brown (10YR 3/4) and strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; firm; very weakly cemented; few medium and coarse roots; 10 percent by volume channers; extremely acid; clear irregular boundary.

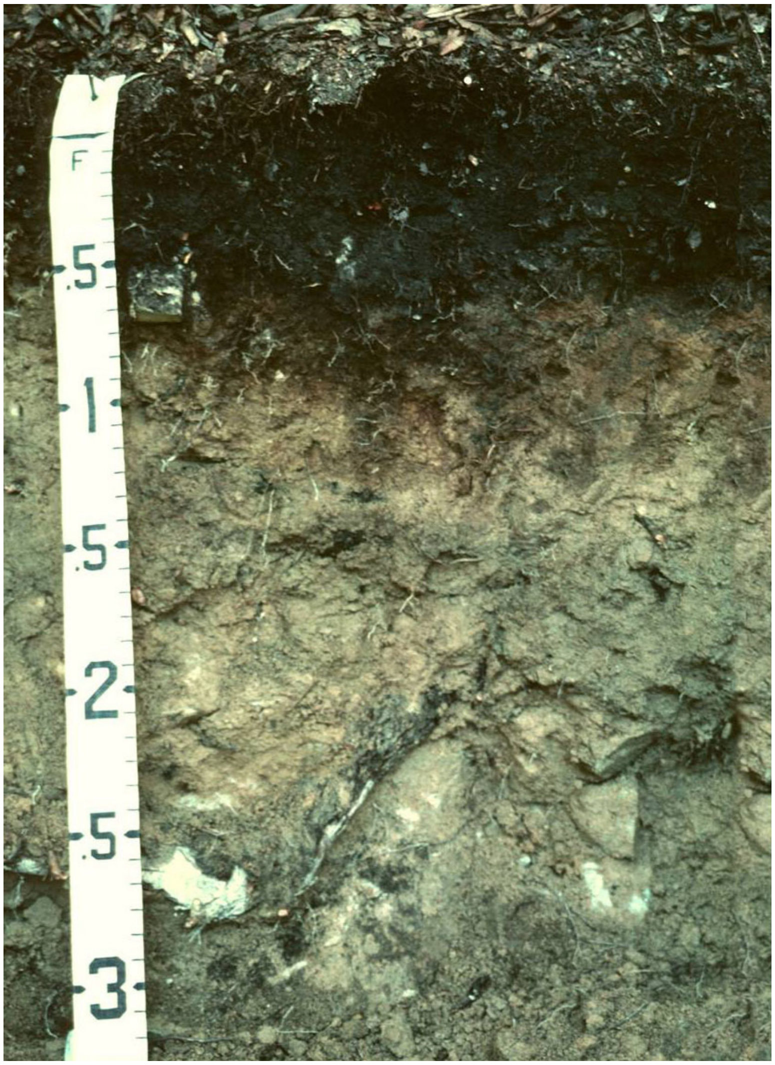

Figure 20.—Typical profile of Chestoa sandy loam. Chestoa soils are moderately deep to unweathered, hard bedrock. They occur on north- to east-facing slopes and those shaded by higher mountains on intermediate mountains. They are predominantly in the northeastern part of Madison County.

Bw1—13 to 18 inches; light yellowish brown (10YR 6/4) channery sandy loam; weak medium subangular blocky structure; firm; few medium and coarse roots; 20 percent by volume channers; very strongly acid; clear wavy boundary.

Bw2—18 to 26 inches; yellowish brown (10YR 5/4) channery sandy loam; common medium distinct light olive brown (2.5Y 5/6) mottles; weak medium subangular blocky structure; friable; few medium and coarse roots; 20 percent by volume channers, 5 percent flagstones; very strongly acid; abrupt wavy boundary.

R—26 to 80 inches; unweathered, hard quartzite bedrock.

Range in Characteristics

Solum thickness: 15 to 40 inches
Depth to bedrock: 20 to 40 inches to hard bedrock
Content of mica flakes: None or few

Rock fragments (content, size): Less than 35 percent by volume; dominantly channers and flagstones

Soil reaction: Extremely acid to strongly acid throughout the profile

A horizon:

Color—hue of 7.5YR to 2.5Y, value of 2 or 3, and chroma of 1 to 3

Texture (fine-earth fraction)—sandy loam, fine sandy loam, loam, loamy fine sand, or loamy sand

Thickness—7 to 10 inches

E horizon:

Color—hue of 7.5YR to 2.5YR, value of 4 to 6, and chroma of 1 to 4

Mottles—in shades of red, yellow, brown, or olive

Texture (fine-earth fraction)—sandy loam, loamy coarse sand, loamy sand, loamy fine sand, fine sandy loam, or loam

Bs horizon:

Color—hue of 7.5YR or 10YR, value of 2 to 5, and chroma of 1 to 6

Mottles—in shades of red, yellow, brown, or olive

Texture (fine-earth fraction)—sandy loam, coarse sandy loam, fine sandy loam, or loam

Bw horizon:

Color—hue of 7.5YR or 2.5Y, value of 4 to 6, and chroma of 3 to 8

Mottles—in shades of red, yellow, brown, or olive

Texture (fine-earth fraction)—sandy loam, coarse sandy loam, fine sandy loam, or loam

C horizon (if it occurs):

Color—hue of 7.5YR or 2.5Y, value of 4 to 6, and chroma of 3 to 8

Mottles—in shades of red, yellow, brown, or olive

Texture (fine-earth fraction)—coarse sandy loam, sandy loam, fine sandy loam, or loam saprolite

R layer:

Type of bedrock—unweathered, hard, low-grade metasedimentary rock; very high or extremely high excavation difficulty

Chiltoskie Series

Depth class: Very deep

Drainage class: Well drained

Depth to seasonal high water table: More than 6.0 feet

Permeability: Moderately rapid

Parent material: Colluvium derived from materials weathered from low-grade metasedimentary rock such as slate, phyllite, and thinly bedded metasandstone

Landscape: High mountains at Sandymush Bald

Landform: Coves and drainageways

Landform position: Head slopes, footslopes, and toeslopes

Slope range: 30 to 50 percent

Taxonomic classification: Fine-loamy, isotic, frigid Typic Dystrudepts

Typical Pedon

Chiltoskie loam in an area of Chiltoskie-Heintooga complex, 30 to 50 percent slopes, very stony; in Swain County, North Carolina; from Bryson City, 9.9 miles east on U.S. Highway 19 to Cherokee, 2.8 miles north on U.S. Highway 441 to the Great Smoky Mountains National Parkway, 11.1 miles northeast on the Blue Ridge Parkway to Wolf

Laurel Gap, 9.1 miles north on Balsam Mountain Road (Blue Ridge Parkway Extension) to the Balsam picnic area, 400 feet south-southeast of the parking area on a forested toeslope; Bunches Bald USGS topographic quadrangle; lat. 35 degrees 34 minutes 17 seconds N. and long. 83 degrees 10 minutes 48 seconds W.; NAD 27:

Oe—0 to 2 inches; moderately decomposed organic litter and root mat.

A—2 to 8 inches; very dark brown (10YR 2/2) loam, dark brown (10YR 3/3) dry; moderate medium to very coarse granular structure; very friable; many fine to coarse and common very coarse roots throughout; common very fine to medium tubular pores; few fine flakes of mica; 5 percent by volume metasandstone channers; extremely acid; clear wavy boundary.

Bw1—8 to 14 inches; dark yellowish brown (10YR 4/4) loam; moderate fine to coarse subangular blocky structure; friable; few medium roots throughout; common very fine to medium tubular pores; few fine flakes of mica; 10 percent by volume metasandstone channers; very strongly acid; clear smooth boundary.

Bw2—14 to 43 inches; dark yellowish brown (10YR 4/6) loam; moderate fine to coarse subangular blocky structure; friable; few very fine tubular pores; few fine flakes of mica; 5 percent by volume metasandstone channers; very strongly acid; clear smooth boundary.

Bw3—43 to 80 inches; dark yellowish brown (10YR 4/6) very channery sandy loam; weak medium and coarse subangular blocky structure; friable; few very fine tubular pores; few fine flakes of mica; 40 percent by volume metasandstone channers; very strongly acid.

Range in Characteristics

Solum thickness: 40 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few or common
Rock fragments (content, size): Less than 35 percent by volume in the upper 40 inches and less than 60 percent below a depth of 40 inches; dominantly channers and flagstones
Soil reaction: Extremely acid to strongly acid throughout the profile

A horizon:
Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3; where value is 3 or less, the horizon is less than 7 inches thick
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, or clay loam

Bw horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 or 6, and chroma of 3 to 8; colors with value and chroma of 3 derived from parent material not organic matter content
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

Cleveland Series

Depth class: Shallow
Drainage class: Somewhat excessively drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Somewhat excessively drained
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock such as granite and biotite gneiss
Landscape: Low and intermediate mountains throughout the county
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes

Slope range: 15 to 95 percent
Taxonomic classification: Loamy, mixed, active, mesic Lithic Dystrudepts

Typical Pedon

Cleveland sandy loam in an area of Ashe-Cleveland-Rock outcrop complex, 30 to 50 percent slopes, very bouldery; in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 16.5 miles northeast on U.S. Highway 25 & 70 to Hot Springs, 8.2 miles south on North Carolina Highway 209 (just south of Bluff), 6.1 miles southwest on Secondary Road 1175 to Joe, 4.1 miles west on Secondary Road 1181 to Little Creek Gap on the Haywood County line, 5.8 miles northeast on Secondary Road 1182 to Lemon Gap on the Tennessee State line, 0.2 mile northeast from an iron gate on U.S. Forest Service Road 3505, about 3.2 miles east-northeast of the gate, 50 feet north of the road on a forested side slope; Lemon Gap USGS topographic quadrangle; lat. 35 degrees 49 minutes 47.4 seconds N. and long. 82 degrees 55 minutes 19.4 seconds W.; NAD 27:

Oe—0 to 1 inch; moderately decomposed organic mat.

A1—1 to 3 inches; dark brown (10YR 3/3) sandy loam, dark yellowish brown (10YR 4/4) dry; weak medium granular structure; very friable; many very fine and fine, common medium, and few coarse roots; common very fine and fine tubular pores; few very fine flakes of mica; 10 percent by volume gravel and cobbles; very strongly acid; clear smooth boundary.

A2—3 to 5 inches; dark yellowish brown (10YR 4/4) loam, yellowish brown (10YR 5/4) dry; weak medium granular structure; very friable; many very fine and fine, common medium, and few coarse roots; few very fine and fine tubular pores; few very fine flakes of mica; 10 percent by volume gravel and cobbles; very strongly acid; clear smooth boundary.

Bw—5 to 16 inches; dark yellowish brown (10YR 4/6) gravelly sandy loam; weak medium subangular blocky structure; very friable; few very fine to medium roots; few very fine to medium tubular pores; few very fine flakes of mica; 20 percent by volume gravel and cobbles; very strongly acid; abrupt wavy boundary.

R—16 to 80 inches; unweathered, hard Max Patch granite bedrock.

Range in Characteristics

Solum thickness: 10 to 20 inches
Depth to bedrock: 10 to 20 inches to hard bedrock
Content of mica flakes: Few or common
Rock fragments (content, size): Less than 35 percent by volume; dominantly gravel or cobbles
Soil reaction: Extremely acid to moderately acid throughout the profile

A horizon:
Color—hue of 7.5YR or 10YR, value of 2 to 5, and chroma of 1 to 4; where value is 3 or less, the horizon is less than 7 inches thick
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

Bw horizon:
Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

C horizon (if it occurs):
Color—horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 or 4, and it may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam saprolite

R layer:

Type of bedrock—unweathered, hard, felsic or mafic high-grade metamorphic or igneous rock; very high or extremely high excavation difficulty

Clifton Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock high in ferro-magnesium minerals such as amphibolite and biotite hornblende gneiss
Landscape: Intermountain hills and low or intermediate mountains dominantly in the Asheville basin in the central and southern portions of the county
Landform: Ridges, hill slopes, and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 2 to 50 percent
Taxonomic classification: Fine, mixed, semiactive, mesic Typic Kanhapludults

Typical Pedon

Clifton clay loam, 15 to 30 percent slopes, moderately eroded; in Madison County, North Carolina (fig. 21); from Marshall, 1.0 mile southeast on U.S. Highways 25 & 70, about 1.3 miles northeast on Secondary Road 1198, about 5.9 miles northeast on North Carolina Highway 213, about 0.4 mile north on a farm road, 100 feet west on a side slope in a hayfield; Mars Hill USGS topographic quadrangle; lat. 35 degrees 49 minutes 57 seconds N. and long. 82 degrees 34 minutes 18 seconds W.; NAD 27:

Ap—0 to 8 inches; strong brown (7.5YR 4/6) clay loam, yellowish brown (10YR 5/6) dry; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; many very fine and fine, common medium, and few coarse roots; common to many fine and medium interstitial and tubular pores; few fine flakes of mica; 2 percent gravel; slightly acid; clear smooth boundary.

Bt1—8 to 23 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; firm; sticky, plastic; common very fine and fine and few medium and coarse roots; common fine and medium interstitial and tubular pores; common continuous distinct reddish brown (2.5YR 4/4) clay films on faces of peds; few fine flakes of mica; moderately acid; gradual wavy boundary.

Bt2—23 to 39 inches; red (2.5YR 4/6) clay; few fine distinct strong brown (7.5YR 5/6) mottles throughout; moderate medium subangular blocky structure; firm; sticky, plastic; few medium roots between peds; common fine interstitial and tubular pores; common discontinuous faint reddish brown (2.5YR 4/4) clay films on faces of peds; few fine rounded soft masses of black (5YR 2.5/1) iron-manganese concretions; few or common flakes of mica; moderately acid; gradual wavy boundary.

Bt3—39 to 56 inches; red (2.5YR 4/6) clay loam; common medium prominent reddish yellow (7.5YR 6/8) mottles throughout; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common very fine and few fine and medium roots; common fine and few medium interstitial and tubular pores; common fine and medium continuous reddish brown (2.5YR 4/4) clay films on faces of peds; common fine and medium rounded soft masses of black (5YR 2.5/1) iron-manganese concretions; few very fine flakes of mica; strongly acid; gradual wavy boundary.

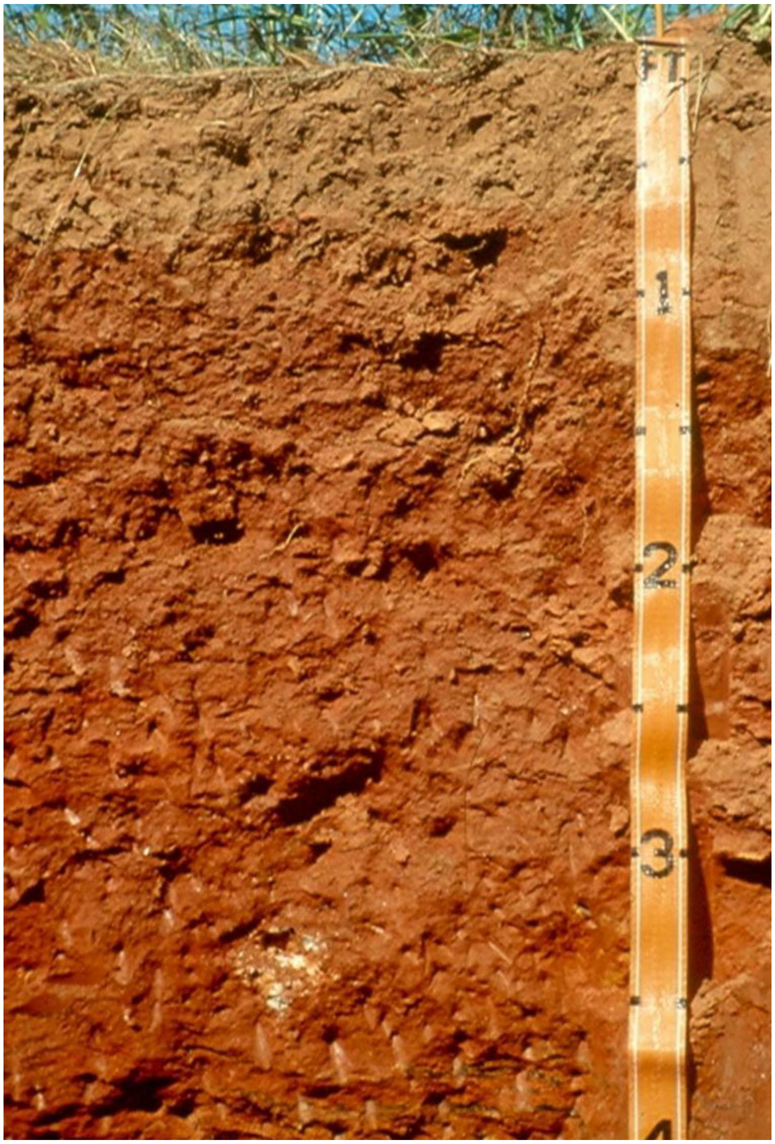

Figure 21.—Typical profile of Clifton clay loam. Clifton soils are very deep over saprolite. They occur on intermountain hills, predominantly in the south-central part of Madison County.

BC1—56 to 83 inches; red (2.5YR 4/6) clay loam; common medium prominent strong brown (7.5YR 5/8) and few medium prominent yellowish brown (10YR 5/6) mottles throughout; weak medium subangular blocky structure; friable, non-sticky, non-plastic; few very fine and fine roots; common very fine and few fine tubular pores; common discontinuous faint yellowish red (5YR 4/6) clay films on faces of peds; many fine and common medium rounded soft masses of black (5YR 2.5/1) iron-manganese concretions throughout; common very fine flakes of mica; strongly acid; gradual wavy boundary.

BC2—83 to 101 inches; red (2.5YR 4/6) loam; common medium prominent reddish yellow (7.5YR 6/8) mottles throughout; weak fine subangular blocky structure; friable, non-sticky, non-plastic; few very fine roots; few very fine and few fine tubular pores; many fine and common medium rounded soft masses of black (5YR

2.5/1) iron-manganese concretions throughout; common very fine flakes of mica; strongly acid; gradual irregular boundary.

C—101 to 116 inches; multicolored loam saprolite in shades of red, brown, yellow, and white; massive; friable; few very fine roots; few very fine tubular pores; many fine rounded soft masses of black (5YR 2.5/1) iron-manganese concretions throughout; common fine flakes of mica; strongly acid.

Range in Characteristics

Solum thickness: 30 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few or common
Rock fragments (content): Less than 15 percent by volume
Soil reaction: Very strongly acid to slightly acid throughout the profile, except where surface layers have been limed

Ap horizon:
Color—hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 6; where value is 3 or less, the horizon is less than 7 inches thick
Texture (fine-earth fraction)—clay loam or sandy clay loam

Bt horizon:
Color—hue of 10R to 5YR, value of 4 or 5, and chroma of 6 to 8
Texture (fine-earth fraction)—clay, clay loam, or sandy clay

BC horizon:
Color—hue of 10R to 5YR, value of 4 to 6, and chroma of 6 to 8
Texture (fine-earth fraction)—clay loam, loam, or sandy clay loam

C horizon:
Color—horizon has hue of 10R to 5YR, value of 4 to 6, and chroma of 6 to 8, and it may be mixed or mottled in shades of these colors
Mottles—shades of red, brown, yellow, gray, or white
Texture (fine-earth fraction)—loam or fine sandy loam saprolite

The Clifton soils in Madison County are considered taxadjuncts to the series because they have a kandic horizon but mixed clay mineralogy. This difference, however, does not significantly affect the use and management of the soils. These soils are classified as fine, mixed, mesic Typic Kanhapludults.

Cowee Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock such as hornblende gneiss, biotite gneiss, or amphibolite
Landscape: Intermountain hills and low or intermediate mountains, dominantly in the north-central, southeastern, and southwestern parts of the county
Landform: Ridges, south- to west-facing hillslopes, and mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Fine-loamy, parasesquic, mesic Typic Hapludults

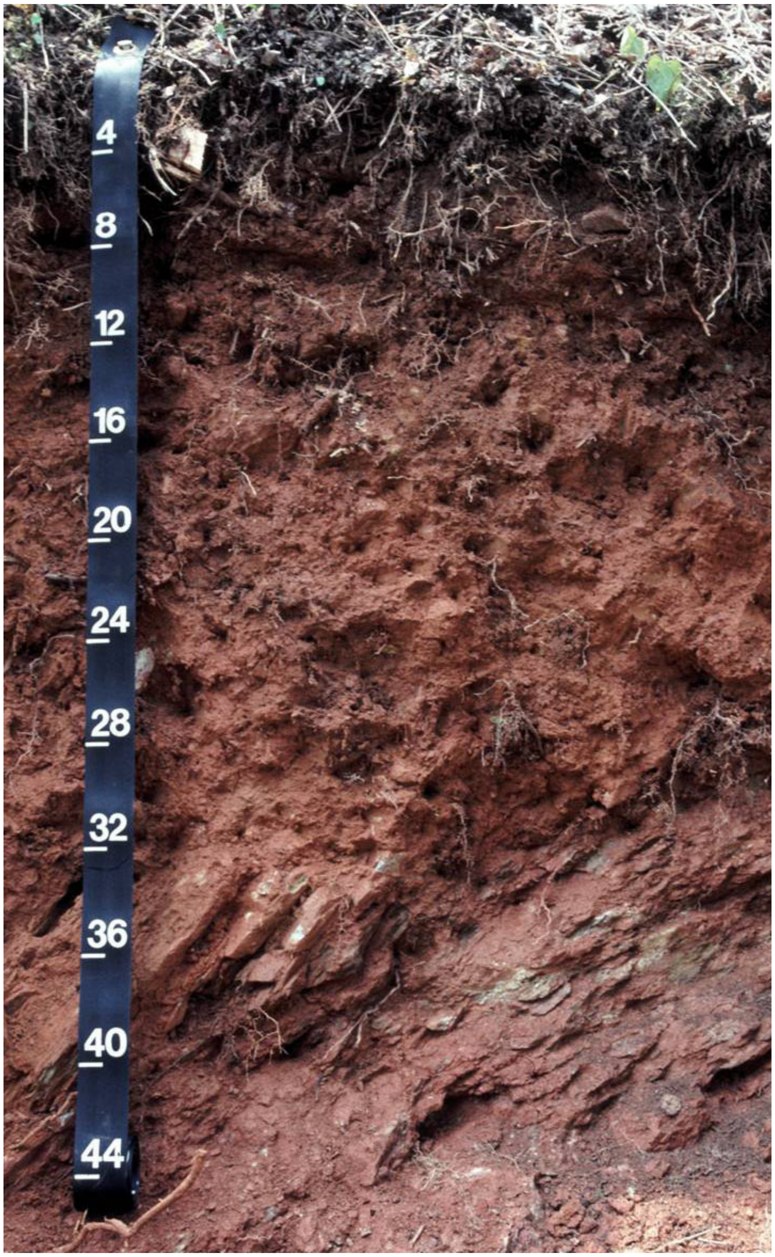

Figure 22.—Typical profile of Cowee sandy loam. Cowee soils are moderately deep to weathered bedrock. They occur on intermountain hills and low or intermediate mountains predominantly in the northern, eastern, and central parts of Madison County.

Typical Pedon

Cowee loam in an area of Evard-Cowee complex, 30 to 50 percent slopes, moderately eroded (fig 22); in Madison County, North Carolina; from Marshall, 1.0 mile southeast on U.S. Highway 25 & 70 Business, 1.3 miles northeast on Secondary Road 1198, about 8.3 miles northeast on North Carolina Highway 213 just east of Mars Hill, 1.7 miles northeast on U.S. Highway 19 & 23, about 0.6 mile northwest on U.S. Highway 19 to Higgins Branch, 0.2 mile east on a private road, 275 feet northwest of the road on a forested side slope; Mars Hill USGS topographic quadrangle; lat. 35 degrees 50 minutes 56.3 seconds N. and long. 82 degrees 31 minutes 21.5 seconds W.; NAD 27:

Oe—0 to 1 inch; moderately decomposed organic mat.

A—1 to 4 inches; brown (10YR 4/3) clay loam, yellowish brown (10YR 5/4) dry; weak medium granular structure; very friable; common very fine and fine and few medium and coarse roots; few very fine to medium tubular pores; few very fine flakes of mica; 20 percent by volume gravel; extremely acid; clear wavy boundary.

BA—4 to 8 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium granular structure; friable; common very fine and fine and few medium and coarse roots; common very fine to medium tubular pores; few very fine flakes of mica; 3 percent by volume gravel; strongly acid; clear wavy boundary.

Bt1—8 to 17 inches; yellowish red (5YR 5/6 clay loam; moderate medium subangular blocky structure; friable; common very fine and fine and few medium and coarse roots; few very fine, fine, and medium tubular pores; few faint red (2.5YR 4/6) clay films on surfaces of peds; 10 percent by volume gravel; very strongly acid; gradual wavy boundary.

Bt2—17 to 28 inches; red (2.5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; few very fine to coarse roots; few very fine to medium tubular pores; common faint yellowish red (5YR 5/8) clay films on surfaces of peds; common fine and medium black (N 2.5/0) iron-manganese concretions throughout; few fine flakes of mica; 10 percent by volume gravel; very strongly acid; gradual irregular boundary.

Cr—28 to 80 inches; weathered, strongly cemented gneiss with high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 15 to 39 inches
Depth to bedrock: 20 to 40 inches to weathered bedrock
Content of mica flakes: Few or common
Rock fragments (content, size): Less than 35 percent by volume; ranging from gravel to stones
Soil reaction: Extremely acid to moderately acid throughout the profile, except where surface layers have been limed

A or Ap horizon:
Color—hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 8; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam; clay loam or sandy clay loam in eroded pedons

BA horizon:
Color—hue of 5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam

Bt horizon:
Color—hue of 2.5YR to 5YR, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—clay loam, sandy clay loam, or loam

BC horizon (if it occurs):
Color—hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, loam, or sandy clay loam

C horizon (if it occurs):
Color—horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8, and it may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam saprolite

Cr layer:

Type of bedrock—weathered, weakly to strongly cemented, felsic or mafic high-grade metamorphic or igneous rock; moderate or high excavation difficulty

Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Dellwood Series

Depth class: Very deep

Drainage class: Moderately well drained

Depth to seasonal high water table: 2.0 to 4.0 feet from December through May and 2.5 to 4.5 feet from June through November

Permeability: Moderately rapid in the A horizon and rapid or very rapid in the C horizon

Parent material: Recent alluvium that is sandy in the upper part and sandy-skeletal in the lower part, derived from materials weathered from felsic or mafic, high-grade metamorphic, igneous, or low-grade metasedimentary rock

Landscape: Mountain valleys of low and intermediate mountains throughout the county

Landform: Flood plains dominantly at the upper end of mountain valleys

Landform position: Planar to slightly convex bottomland slopes

Slope range: 0 to 3 percent

Taxonomic classification: Sandy-skeletal, mixed, mesic Oxyaquic Dystrudepts

Typical Pedon

Dellwood gravelly fine sandy loam in an area of Dellwood-Reddies complex, 0 to 3 percent slopes, occasionally flooded (fig. 23); in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 10.5 miles north on U.S. Highway 25 & 70 to Hurricane, 4.1 miles north on North Carolina Highway 208 to Belva, 11.3 miles northeast on North Carolina Highway 212, about 0.1 mile southwest on a private road, 75 feet south of the road in a hayfield; White Rock USGS topographic quadrangle; lat. 35 degrees 59 minutes 50 seconds N. and long. 82 degrees 39 minutes 03 seconds W.; NAD 27:

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) gravelly fine sandy loam, dark yellowish brown (10YR 3/4) dry; weak fine granular structure; very friable; many very fine and fine and few medium roots; many very fine and fine tubular pores; few fine flakes of mica; 12 percent by volume gravel and 8 percent cobbles; moderately acid; clear smooth boundary.

A—10 to 14 inches; dark brown (10YR 3/3) cobbly sandy loam, dark yellowish brown (10YR 4/6) dry; weak medium granular structure; very friable; many very fine and fine and few medium roots; many very fine and fine tubular pores; few fine flakes of mica; 15 percent by volume gravel and 10 percent cobbles; moderately acid; abrupt wavy boundary.

C1—14 to 28 inches; dark yellowish brown (10YR 4/6) very cobbly coarse sand; common fine faint dark yellowish brown (10YR 4/4) mottles; single grain; loose; few fine and medium roots; few fine and medium flakes of mica; 25 percent by volume gravel and 15 percent cobbles; moderately acid; clear smooth boundary.

C2—28 to 34 inches; multicolored very cobbly coarse sand in shades of brown, yellow, and gray; single grain; loose; few fine and medium roots; few fine and medium flakes of mica; 25 percent by volume gravel, 20 percent cobbles, and 10 percent stones; strongly acid; gradual wavy boundary.

C3—34 to 80 inches; multicolored extremely cobbly coarse sand in shades of brown, yellow, and gray; single grain; loose; few very fine and medium roots; few fine distinct dark grayish brown (10YR 4/2) and light brownish gray (10YR 6/2) irregularly shaped iron depletions with clear boundaries throughout; common fine

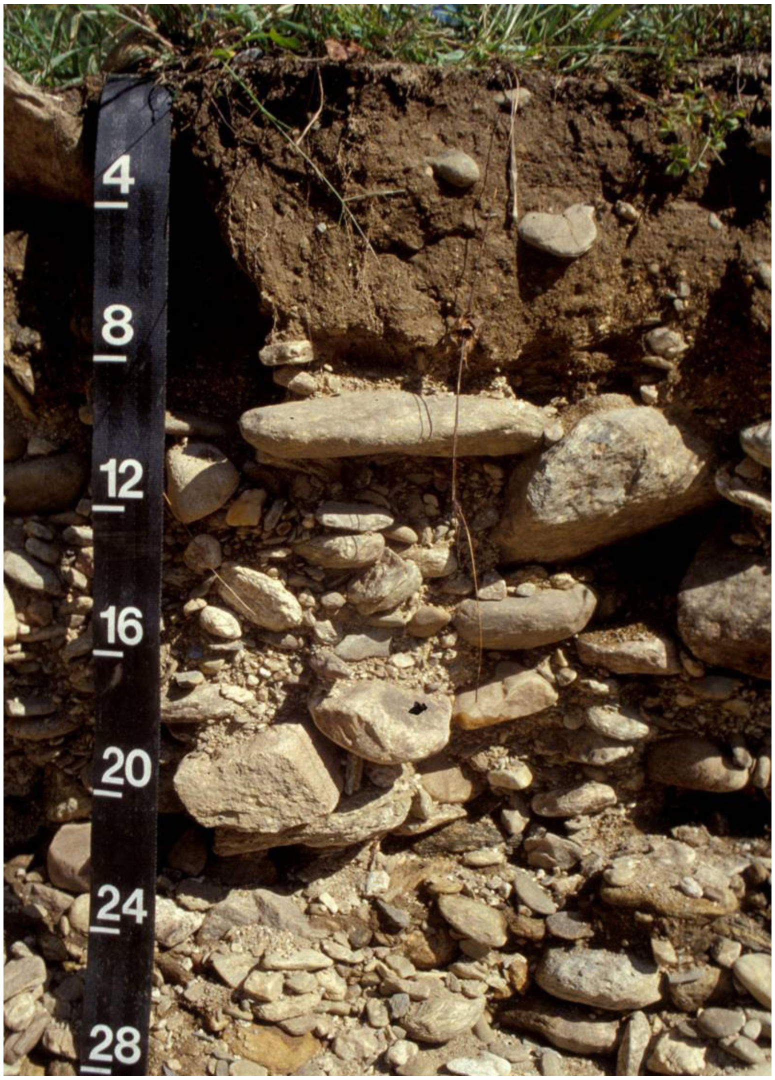

Figure 23.—Typical profile of Dellwood gravelly fine sandy loam. Dellwood soils formed from material deposited by streams and consist mainly of sand, gravel, and cobbles. They occur predominantly at the upper end of flood plains throughout Madison County.

and medium flakes of mica; 20 percent by volume gravel, 30 percent cobbles, and 15 percent stones; strongly acid.

Range in Characteristics

Solum thickness: 8 to 20 inches
Depth to contrasting material: 8 to 20 inches to deposits of cobbles and gravel stratified with sandy or loamy material
Depth to bedrock: More than 60 inches
Content of mica flakes: Few or common in the A and B horizons and few to many in the C horizon
Rock fragments (content, size): Less than 35 percent by volume in the A and B horizons and more than 35 percent in the C horizon; dominantly gravel or cobbles but including stones
Soil reaction: Very strongly acid to neutral throughout the profile

A or Ap horizon:
Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loamy fine sand
Thickness of A horizon—10 to 20 inches

AC horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 3, and chroma of 2 to 4
Texture—coarse sand, sand, loamy coarse sand, or loamy sand

Bw horizon (if it occurs):
Color—hue of 7.5YR or 10YR and value and chroma of 4 to 6
Texture (fine-earth fraction)—sandy loam or fine sandy loam

C horizon:
Color—hue of 7.5YR, value of 3 to 5, and chroma of 4 to 6 or hue of 10YR and value and chroma of 4 to 6
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—coarse sand, sand, loamy coarse sand, or loamy sand alluvium

Dillard Series

Depth class: Very deep
Drainage class: Moderately well drained
Depth to seasonal high water table: 2.0 to 3.0 feet from December through May and 2.0 to 3.5 feet from June through November
Permeability: Moderately slow
Parent material: Loamy alluvium and colluvium derived from materials weathered from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountain valleys of low mountains, dominantly in the Shelton Laurel and Spring Creeks areas, northwestern parts of the county, and the intermountain hills of southeastern parts of the county
Landform: Low stream terraces
Landform position: Concave to planar toeslopes
Slope range: 1 to 5 percent
Taxonomic classification: Fine-loamy, mixed, semiactive, mesic Aquic Hapludults

Typical Pedon

Dillard loam, 1 to 5 percent slopes, rarely flooded; in Buncombe County, North Carolina; from Asheville, 5.2 miles on I-240 East to I-40 and U.S. Highway 74 interchange, 6.9 mile southeast on U.S. Highway 74, about 3.8 miles southwest on Secondary Road 3136, about 0.25 mile south on a private road, 400 feet south of the road in a cultivated field; Fruitland USGS topographic quadrangle; lat. 35 degrees 28 minutes 34.2 seconds N. and long. 82 degrees 26 minutes 27.5 seconds W.; NAD 27:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) loam, light yellowish brown (10YR 6/4) dry; weak medium subangular blocky structure; friable; few very fine mica flakes; strongly acid; abrupt smooth boundary.
Bt1—8 to 25 inches; dark yellowish brown (10YR 4/6) sandy clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; few very fine mica flakes; very strongly acid; gradual wavy boundary.
Bt2—25 to 31 inches; light yellowish brown (10YR 6/4) clay loam; moderate medium subangular blocky structure; friable; many medium prominent strong brown (7.5YR 5/8) and brownish yellow (10YR 6/8) irregularly shaped masses of iron

accumulation with clear boundaries in the matrix; few faint clay films on faces of peds; few very fine mica flakes; very strongly acid; gradual wavy boundary.

Btg—31 to 43 inches; light brownish gray (10YR 6/2) clay loam; moderate medium subangular blocky structure; friable; many medium faint grayish brown (10YR 5/2) irregularly shaped iron depletions with clear boundaries throughout; common distinct clay films on faces of peds; common very fine mica flakes; very strongly acid; gradual smooth boundary.

BCg—43 to 51 inches; light brownish gray (10YR 6/2) loam; massive; friable; many medium faint light gray (10YR 7/1) irregularly shaped iron depletions with clear boundaries throughout; few very fine mica flakes; strongly acid; gradual wavy boundary.

Cg—51 to 80 inches; grayish brown (10YR 5/2) sandy loam; massive; friable; common medium prominent dark gray (N 4/0) irregularly shaped iron depletions with clear boundaries throughout; few very fine mica flakes; 8 percent by volume waterworn gravel and 2 percent cobbles; very strongly acid.

Range in Characteristics

Solum thickness: 30 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few or common
Rock fragments (content, size): Less than 5 percent by volume in the A, Ap, or BA horizon; less than 15 percent in the Bt horizon; less than 5 percent in the Btg, 2Btg, BCg, or 2BCg horizon; less than 35 percent in the C, 2C, Cg, or 2Cg horizon
Soil reaction: Strongly acid to moderately acid in the A horizon, except where surface layers have been limed, and very strongly acid to moderately acid in the B and C horizons

Ap horizon:
Color—hue of 10YR, value of 3 to 5, and chroma of 1 to 4; where value is 3 or less, the A horizon is less than 10 inches thick
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam

Bt horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray; iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—sandy clay loam or clay loam

Btg and BCg horizons:
Color—hue of 10YR, value of 5 to 7, and chroma of 1 or 2
Redoximorphic features—iron or clay depletions in shades of gray; iron accumulations in shades of brown or yellow
Texture (fine-earth fraction)—clay loam, loam, or sandy clay loam

C horizon (if it occurs):
Color—hue of 10YR to 5Y, value of 5 to 7, and chroma of 3 to 8
Redoximorphic features—iron or clay depletions in shades of gray; iron accumulations in shades of red, brown, or yellow
Texture (fine-earth fraction)—loam, sandy clay loam, or clay loam alluvium/colluvium

Cg horizon:
Color—hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2
Redoximorphic features—iron or clay depletions in shades of red, yellow, brown, olive, or gray
Texture (fine-earth fraction)—loam, sandy clay loam, or clay loam alluvium/colluvium

Ditney Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock such as feldspathic metasandstone, quartzite, or arkosic sandstone
Landscape: Low and intermediate mountains in the northwestern and northern parts of the county
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Coarse-loamy, mixed, semiactive, mesic Typic Dystrudepts

Typical Pedon

Ditney fine sandy loam in an area of Ditney-Unicoi complex, 50 to 95 percent slopes, very rocky; in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 16.5 miles northeast on U.S. Highway 25 & 70 to Hot Springs, 3.1 miles south on N.C. Highway 209 and 350 feet north of the Rocky Bluff campground entrance, 200 feet northwest of the road on a forested side slope; Spring Creek USGS topographic quadrangle; lat. 35 degrees 51 minutes 50 seconds N. and long. 82 degrees 50 minutes 53 seconds W.; NAD 27:

Oe—0 to 1 inch; moderately decomposed organic mat.
A1—1 to 4 inches; dark brown (10YR 3/3) fine sandy loam, grayish brown (10YR 5/2) dry; weak fine granular structure; very friable; common very fine and fine and few medium and coarse roots; common very fine to coarse tubular pores; 8 percent by volume gravel and 2 percent cobbles; extremely acid; clear smooth boundary.
A2—4 to 7 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine granular structure; very friable; common very fine and fine and few medium and coarse roots; common very fine to coarse tubular pores; 8 percent by volume gravel and 2 percent cobbles; very strongly acid; clear wavy boundary.
Bw1—7 to 15 inches; yellowish brown (10YR 5/4) sandy loam; moderate medium subangular blocky structure; friable; many fine and medium roots; few very fine to coarse tubular pores; 8 percent by volume gravel and 4 percent cobbles; very strongly acid; gradual wavy boundary.
Bw2—15 to 23 inches; yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; friable; few fine and medium roots; few fine and medium tubular pores; 8 percent by volume gravel and 4 percent cobbles; very strongly acid; gradual wavy boundary.
BC—23 to 29 inches; brownish yellow (10YR 6/8) cobbly sandy loam; weak fine subangular blocky structure; very friable; few fine and medium roots; few fine and medium tubular pores; 10 percent by volume gravel, 10 percent cobbles, and 5 percent stones; extremely acid; clear irregular boundary.
R—29 to 80 inches; unweathered, hard interbedded quartzite and arkosic metasandstone bedrock.

Range in Characteristics

Solum thickness: 20 to 40 inches
Depth to bedrock: 20 to 40 inches to hard bedrock
Content of mica flakes: None or few
Rock fragments (content, size): 5 to 35 percent by volume in the A and Bw horizons

and 10 to 40 percent in the BC horizon; dominantly gravel or cobbles but including channers, flagstones, and stones
Soil reaction: Extremely acid to strongly acid throughout the profile

A horizon:
Color—hue of 10YR, value of 3 to 5, and chroma of 1 to 4; where value is 3 or less, the horizon is less than 7 inches thick
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

BE horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

Bw horizon:
Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

BC horizon:
Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam; coarser textures, more rock fragments, and weaker structures than the Bw horizon

Cr layer (if it occurs):
Type of bedrock—weathered, weakly to strongly cemented, low-grade metasedimentary rock; moderate or high excavation difficulty
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:
Type of bedrock—unweathered, hard, low-grade metasedimentary rock; very high or extremely high excavation difficulty

The Ditney soils in Madison County are considered taxadjuncts to the series because the sand fraction in the mineralogy control section contains slightly more resistant materials than the maximum value allowed by series classification (indicating siliceous mineralogy). This difference, however, does not significantly affect the use and management of the soils. These soils are classified as coarse-loamy, siliceous, semiactive, mesic Typic Dystrudepts.

Edneyville Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock such as granite and biotite gneiss
Landscape: Low and intermediate mountains, dominantly in the southwestern and southeastern parts of the county
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Coarse-loamy, mixed, active, mesic Typic Dystrudepts

Typical Pedon

Edneyville sandy loam in an area of Edneyville-Chestnut complex, 30 to 50 percent slopes, stony; in Buncombe County, North Carolina; from Asheville, 5.1 miles east on Interstate 240, about 12.2 miles east on Interstate 40 to Black Mountain, turn on exit 64, about 11.9 miles south on North Carolina Highway 9, about 3.5 miles southeast on Secondary Road 2796, about 250 feet south-southeast of the road on a 40 percent side slope in a forested area; Moffitt Hill USGS topographic quadrangle; lat. 35 degrees 30 minutes 10.2 seconds N. and long. 82 degrees 13 minutes 38.6 seconds W.; NAD 27:

Oe—0 to 2 inches; moderately decomposed organic mat.

A—2 to 5 inches; dark grayish brown (10YR 3/4) sandy loam, yellowish brown (10YR 5/4) dry; weak medium granular structure; very friable; many very fine and fine, common medium, and few coarse roots; many very fine to medium and common coarse tubular pores; 5 percent by volume gravel; very strongly acid; clear smooth boundary.

Bw1—5 to 23 inches; dark yellowish brown (10YR 4/6) sandy loam; weak medium subangular blocky structure; friable; common very fine to medium and few coarse roots; common fine to medium and few coarse tubular pores; few fine flakes of mica; 5 percent by volume gravel; strongly acid; clear wavy boundary.

Bw2—23 to 46 inches; yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; friable; few very fine to medium roots; few very fine to medium tubular pores; few very fine flakes of mica; 5 percent by volume gravel; strongly acid; gradual wavy boundary.

BC—46 to 53 inches; yellowish brown (10YR 5/4) sandy loam; weak fine subangular blocky structure; very friable; few very fine to coarse roots; common very fine to medium tubular pores; few very fine flakes of mica; 3 percent by volume gravel; very strongly acid; gradual wavy boundary.

C—53 to 68 inches; light yellowish brown (10YR 6/4) sandy loam saprolite; massive; very friable; few medium roots; few very fine to coarse tubular pores; few thin discontinuous lenses of loamy sand; few very fine flakes of mica; 10 percent by volume gravel; very strongly acid; abrupt smooth boundary.

Cr—68 to 80 inches; weathered, strongly cemented gneiss with high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 20 to 55 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few or common
Rock fragments (content, size): Less than 35 percent by volume; dominantly gravel
Soil reaction: Extremely acid to moderately acid in the A horizon and very strongly or strongly acid in the B and C horizons

A or Ap horizon:
Color—hue of 7.5YR to 2.5Y, value of 2 to 5, and chroma of 1 to 4; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

AB horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 4
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

Bw horizon:
Color—hue of 7.5YR or 2.5Y, value of 4 to 7, and chroma of 3 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

BC horizon:
Color—horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 3 to 8, or

it is mixed or mottled in shades of these colors; colors with chroma of 2 or less are inherited from the parent material and are not caused by wetness

Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

C horizon:

Color—horizon has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8, or it is mixed or mottled in shades of these colors; colors with chroma of 2 or less are inherited from the parent material and are not caused by wetness

Texture (fine-earth fraction)—sandy loam, fine sandy loamy, loam, loamy fine sand, or loamy sand saprolite

Cr layer:

Type of bedrock—weathered, weakly to strongly cemented, felsic or mafic high-grade metamorphic or igneous rock; moderate or high excavation difficulty

Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Ela Series

Depth class: Very deep

Drainage class: Poorly drained

Depth to seasonal high water table: 1.0 foot or less from December through May, 2.0 to 3.5 feet from June through November, and 0.5 foot to 1.5 feet from June through November

Permeability: Moderately rapid in the surface horizon and upper portion of the underlying material and rapid in the lower portion

Parent material: Recent alluvium that is loamy in the upper part and sandy or sandy-skeletal in the lower part, derived from material weathered from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock

Landscape: Mountain valleys of low and intermediate mountains, dominantly in the northeastern part of the county

Landform: Flood plains

Landform position: Planar to slightly concave bottomland slopes

Slope range: 0 to 2 percent

Taxonomic classification: Coarse-loamy, siliceous, superactive, acid, mesic Fluvaquentic Humaquepts

Typical Pedon

Ela loam, 0 to 2 percent slopes, frequently flooded; in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 16.5 miles northeast on U.S. Highway 25 & 70 to Hot Springs, 13.4 miles south on N.C. Highway 209, about 0.1 mile east on a farm road and 130 feet south in a cultivated field; Spring Creek USGS topographic quadrangle; lat. 35 degrees 46 minutes 16.9 seconds N. and long. 82 degrees 52 minutes 23.9 seconds W.; NAD 27:

A—0 to 13 inches; very dark grayish brown (10YR 3/2) loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; very friable; many fine and medium roots throughout; common fine and medium pores; common very fine flakes of mica; 3 percent by volume gravel; neutral; clear smooth boundary.

Cg—13 to 38 inches; dark grayish brown (10YR 4/2) gravelly sandy loam; massive; very friable; few fine and medium roots throughout; few or common fine and medium pores; many fine faint dark yellowish brown (10YR 4/4) irregularly shaped soft masses of iron accumulations throughout and dark grayish brown (10YR 4/2) irregularly shaped iron depletions throughout; common very fine flakes of mica; 5

percent by volume well rounded gravel and 5 percent cobbles; slightly acid; clear wavy boundary.

2Cg—38 to 80 inches; dark gray (10YR 4/1) very cobbly sandy loam; massive; loose; few medium roots throughout; 15 percent by volume gravel, 25 percent cobbles, and 5 percent stones; very slightly acid.

Range in Characteristics

Depth to contrasting material: 20 to 40 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few or common
Rock fragments (content, size): 5 to 35 percent in the horizons above the 2Cg horizon and 35 to 80 percent in the 2Cg horizon; dominantly well rounded gravel or cobbles
Soil reaction: Very strongly acid to slightly acid throughout the profile

A or Ap horizon:
Color—hue of 7.5YR or 2.5Y, value of 2 or 3, and chroma of 1 to 3; dry value is less than 5
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam
Thickness of A horizon—10 to 22 inches

AC horizon (if it occurs):
Color—hue of 7.5YR or 2.5Y, value of 2 or 3, and chroma of 1 to 3
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam

Cg horizon:
Color—hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 to 2
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray
Texture (fine-earth fraction)—sandy loam, fine sandy loam, loam, or coarse sandy loam alluvium

2Cg horizon:
Color—hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 to 2
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or coarse sandy loam alluvium
Other characteristics—horizon is at or below the free water table and is continually saturated year-round

Evard Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock such as hornblende gneiss, biotite gneiss, or amphibolite
Landscape: Intermountain hills and low or intermediate mountains, dominantly in the north-central, southeastern, and southwestern parts of the county
Landform: Ridges, south- to west-facing hillslopes, and mountain slopes
Landform position: Summits and side slopes

Slope range: 15 to 95 percent
Taxonomic classification: Fine-loamy, parasesquic, mesic Typic Hapludults

Typical Pedon

Evard loam in an area of Evard-Cowee complex, 30 to 50 percent slopes, stony; in Madison County, North Carolina; from Marshall, 1.0 mile southeast on U.S. Highways 25 & 70 Business, 1.3 miles northeast on Secondary Road 1198, about 8.3 miles northeast on North Carolina Highway 213, just east of Mars Hill, 1.7 miles northeast on U.S. Highway 19 & 23, about 0.6 mile northwest on U.S. Highway 19 to Higgins Branch, 0.2 mile east on a private road, 450 feet north of the road on a forested side slope; Mars Hill USGS topographic quadrangle; lat. 35 degrees 50 minutes 58 seconds N. and long. 82 degrees 31 minutes 20 seconds W.; NAD 27:

Oe—0 to 1 inch; moderately decomposed organic mat.

A—1 to 3 inches; dark yellowish brown (10YR 4/4) loam, light yellowish brown (10YR 6/4) dry; weak medium granular structure; very friable; common very fine and fine and few medium and coarse roots; common very fine to medium tubular pores; few very fine flakes of mica; 3 percent by volume gravel; strongly acid; clear smooth boundary.

BA—3 to 6 inches; strong brown (7.5YR 4/6) loam; moderate medium granular structure; friable; common very fine and fine and few medium and coarse roots; common very fine to medium tubular pores; few very fine flakes of mica; 3 percent by volume gravel; strongly acid; clear wavy boundary.

Bt1—6 to 17 inches; yellowish red (5YR 5/8) clay loam; moderate medium subangular blocky structure; friable; common very fine and few fine to coarse roots; few fine and medium tubular pores; few faint yellowish red (5YR 4/6) clay films on faces of peds; few very fine flakes of mica; 3 percent by volume gravel; strongly acid; gradual wavy boundary.

Bt2—17 to 33 inches; yellowish red (5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; few very fine to medium roots; few very fine to medium tubular pores; few faint red (2.5YR 4/8) clay films on faces of peds; common fine and medium black (N 2.5/0) iron-manganese concretions; few very fine flakes of mica; 5 percent by volume gravel; strongly acid; gradual wavy boundary.

BC—33 to 46 inches; yellowish red (5YR 4/6) loam; weak fine subangular blocky structure; very friable; few very fine to coarse roots; few very fine and fine tubular pores; few faint red (2.5YR 4/8) clay films in cracks; many fine, medium, and coarse black (N 2.5/0) iron-manganese concretions; few or common fine flakes of mica; 5 percent by volume gravel; strongly acid; gradual wavy boundary.

C1—46 to 63 inches; reddish brown (5YR 5/4) loam saprolite; common moderate distinct reddish yellow (7.5YR 6/8) and common moderate distinct yellowish brown (10YR 5/4) mottles; massive; very friable; few very fine and medium roots; few very fine and fine tubular pores; many fine, medium, and coarse black (N 2.5/0) iron-manganese concretions; common fine flakes of mica; 5 percent by volume gravel; strongly acid; gradual wavy boundary.

C2—63 to 80 inches; multicolored sandy loam saprolite in shades of red, brown, yellow, gray, and white; massive; very friable; few very fine and medium roots; few very fine and fine tubular pores; many fine, medium, and coarse black (N 2.5/0) iron-manganese concretions; common fine flakes of mica; 5 percent by volume gravel; strongly acid.

Range in Characteristics

Solum thickness: 20 to more than 40 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: None to common

Rock fragments (content, size): Less than 35 percent by volume in the A and C horizons and less than 15 percent in the B horizon; ranging from gravel to stones
Soil reaction: Very strongly acid to moderately acid throughout the profile, except where surface layers have been limed

A or Ap horizon:
Color—hue of 5YR to 10YR, value of 3 to 5, and chroma of 3 to 6; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam; sandy clay loam or clay loam in eroded pedons

BA horizon:
Color—has hue of 2.5YR to 10YR and value and chroma of 4 to 8
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, sandy clay loam, or clay loam

Bt horizon:
Color—hue of 2.5YR to 5YR, value of 4 or 5, and chroma of 4 to 8
Texture (fine-earth fraction)—clay loam, loam, or sandy clay loam

BC horizon:
Color—horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 6 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, sandy clay loam, or clay loam

C horizon:
Color—horizon has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 6 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—loam, sandy loam, loamy sand, loamy fine sand, fine sandy loam, or very fine sandy loam saprolite

Fannin Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate
Parent material: Residuum affected by soil creep in the upper part, weathered from high-grade metamorphic rock with a high mica content, such as mica schist or mica gneiss
Landscape: Intermediate mountains, dominantly near Old Field Gap along the county line in the southeastern part of the county
Landform: Ridges
Landform position: Summits and upper side slopes
Slope range: 15 to 30 percent
Taxonomic classification: Fine-loamy, paramicaceous, mesic Typic Hapludults

Typical Pedon

Fannin sandy clay loam, 15 to 30 percent slopes, moderately eroded; in Yancey County, North Carolina; from Burnsville, 0.3 mile north on Secondary Road 1369, about 0.4 mile north on Secondary Road 1373, about 0.3 mile north on Secondary Road 1443, about 150 feet south in woodland; Burnsville USGS topographic quadrangle; lat. 35 degrees 55 minutes 46 seconds N. and long. 82 degrees 17 minutes 55 seconds W.; NAD 27:

Oe—0 to 1 inch; moderately decomposed organic mat.

A—1 to 4 inches; brown (7.5YR 4/4) sandy clay loam, strong brown (7.5YR 5/6) dry; weak fine granular structure; very friable; common very fine and fine roots; common very fine and fine vesicular pores; many very fine and fine flakes of mica; 5 percent by volume gravel; very strongly acid; clear smooth boundary.

Bt1—4 to 18 inches; red (2.5YR 4/8) sandy clay loam; moderate medium subangular blocky structure; firm; few fine roots; common very fine and fine and few coarse tubular pores; common distinct yellowish red (5YR 4/6) clay films on faces of peds; many very fine flakes of mica; 5 percent by volume gravel; very strongly acid; gradual wavy boundary.

Bt2—18 to 27 inches; red (2.5YR 4/8) clay loam; common medium distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; few fine tubular pores; many very fine mica flakes; 5 percent by volume gravel; strongly acid; clear smooth boundary.

BC—27 to 31 inches; yellowish red (5YR 5/8) sandy clay loam; weak medium subangular blocky structure; very friable; few coarse and common fine and medium roots; few very fine tubular pores; very few faint yellowish red (5YR 4/6) clay films in root channels and pores; many fine flakes of mica; 5 percent by volume gravel; strongly acid; clear smooth boundary.

C—31 to 80 inches; multicolored fine sandy loam saprolite in shades of red, yellow, and brown; massive; few medium and coarse roots; few very fine tubular pores; 5 percent by volume gravel; strongly acid.

Range in Characteristics

Solum thickness: 20 to 45 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Common or many in the A horizon and upper part of the B horizon and many in the lower part of the B horizon and in the C horizon
Rock fragments (content, size): Less than 35 percent by volume in the A and C horizon and 0 to 25 percent in the B horizon; dominantly gravel or cobbles
Soil reaction: Very strongly acid to slightly acid throughout the profile

A horizon:
Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4; where value is 3 or less, the horizon is less than 7 inches thick
Texture (fine-earth fraction)—sandy clay loam or clay loam

Bt horizon:
Color—hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8
Mottles—shades of red, brown, and yellow
Texture (fine-earth fraction)—loam, sandy clay loam, or clay loam

BC horizon:
Color—hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8
Mottles—shades of red, brown, and yellow
Texture (fine-earth fraction)—sandy clay loam, loam, fine sandy loam, or sandy loam

C horizon:
Color—horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam saprolite

French Series

Depth class: Very deep
Drainage class: Moderately well drained to somewhat poorly drained

Depth to seasonal high water table: 1.0 to 2.5 feet from December through May and 2.0 to 3.5 feet from June through November
Permeability: Moderate in the surface layer and subsoil and rapid in the underlying material
Parent material: Recent alluvium that is loamy in the upper part and sandy or sandy-skeletal in the lower part, derived from materials weathered from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountains valleys of intermountain hills and low and intermediate mountains throughout the county
Landform: Flood plains throughout the county
Landform position: Planar to slightly concave bottomland slopes
Slope range: 0 to 3 percent
Taxonomic classification: Fine-loamy over sandy or sandy-skeletal, mixed, active, mesic Fluvaquentic Dystrudepts

Typical Pedon

French loam, 0 to 3 percent slopes, occasionally flooded; in Madison County, North Carolina; from Marshall, 1.0 mile southeast on U.S. Highway 25 & 70, about 1.3 miles northeast on Secondary Road 1198, about 7.4 miles northeast on North Carolina Highway 213 to Mars Hill, 1.0 mile south on Secondary Road 1609, about 1.5 miles southwest on Secondary Road 1559, about 200 feet north on a farm road, 275 feet west of the road and 100 feet east of Gabriel Creek, in a cultivated field; Mars Hill USGS quadrangle; lat. 35 degrees 48 minutes 15 seconds N. and long. 82 degrees 33 minutes 56 seconds W.; NAD 27:

Ap—0 to 12 inches; brown (10YR 4/3) loam, yellowish brown (10YR 5/4) dry; weak medium granular structure; friable; common very fine and fine roots; common fine and few medium tubular pores; few fine flakes of mica; 3 percent by volume gravel; slightly acid; abrupt smooth boundary.
Bw1—12 to 20 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; common very fine and fine roots; few very fine to medium tubular pores; few medium faint dark grayish brown (10YR 4/2) and dark reddish brown (2.5YR 3/4) irregularly shaped iron depletions and accumulations, respectively, with clear boundaries throughout; common fine flakes of mica; 3 percent by volume gravel; moderately acid; clear smooth boundary.
Bw2—20 to 30 inches; dark yellowish brown (10YR 4/4) loam; weak medium subangular blocky structure; friable; few very fine and fine roots; few fine tubular pores; many coarse distinct grayish brown (10YR 5/2) and few faint distinct dark reddish brown (2.5YR 3/4) irregularly shaped iron depletions and accumulations, respectively, with clear boundaries throughout; common fine flakes of mica; 3 percent by volume gravel; moderately acid; clear smooth boundary.
C—30 to 34 inches; yellowish brown (10YR 5/6) very gravelly loamy sand; single grain; very friable; areas with dark reddish brown (2.5YR 3/4) iron accumulations and areas with grayish brown (10YR 5/2) iron depletions; few sand strata 1 to 3 inches thick; common fine flakes of mica; 35 percent by volume gravel and 10 percent cobbles; slightly acid; abrupt broken boundary.
Cg—34 to 80 inches; grayish brown (10YR 5/2) extremely gravelly sand; single grain; loose; few very fine and fine roots; few medium tubular pores; common fine flakes of mica; 55 percent by volume gravel and 15 percent cobbles; moderately acid.

Range in Characteristics

Solum thickness: 20 to 40 inches
Depth to contrasting material: 20 to 40 inches to deposits of cobbles and gravel that are stratified with sandy or loamy material
Depth to bedrock: More than 60 inches

Content of mica flakes: Few or common
Rock fragments (content, size): Less than 15 percent by volume in the upper part of the profile to depth of 20 to 40 inches and more than 35 percent in the lower part; dominantly gravel or cobbles but possibly including stones
Soil reaction: Strongly acid to slightly acid throughout the profile

Ap or A horizon:
Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 1 to 4; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam

BA horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 4 to 8
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray; iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, or sandy clay loam

Bw horizon:
Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray; iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, sandy clay loam, or clay loam

C horizon:
Color—horizon has hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 2 to 8 and may be mixed or mottled in shades of these colors
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray; iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—loamy sand, sandy loam, or loam alluvium

Cg horizon:
Color—hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray; iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—sand, loamy sand, coarse sand, or loamy coarse sand alluvium; thin horizons of loam, silt loam, or sandy clay loam occur in some pedons

Guyot Series

Depth class: Deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate in the surface layer and moderately rapid in the subsoil and underlying material
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock such as slate, phyllite, and thinly bedded metasandstone
Landscape: High mountains at Sandymush Bald
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Slope range: 8 to 95 percent
Taxonomic classification: Fine-loamy, isotic, frigid Humic Dystrudepts

Typical Pedon

Guyot clay loam in an area of Oconaluftee-Guyot-Cataloochee complex, windswept, 18 to 15 percent slopes, bouldery; in Haywood County, North Carolina; from Waynesville, 1.0 mile north of Main Street on U.S. Highway 276, about 7.5 miles southwest on U.S. Highway 23 & 74, about 0.65 mile northwest on the Blue Ridge Parkway entrance road at Balsam Gap on the Haywood-Jackson County line, 14.9 miles south on the Blue Ridge Parkway to Wolf Laurel Gap, 6.2 miles north on Balsam Mountain Road (Blue Ridge Parkway Extension) in the Great Smoky Mountains National Park to the Polls Gap trail head, 150 feet southeast of a parking area, on a forested summit; Bunches Bald USGS topographic quadrangle; lat. 35 degrees 33 minutes 44 seconds N. and long. 83 degrees 09 minutes 39 seconds W.; NAD 27:

Oe—0 to 1 inch; moderately decomposed organic litter and root mat.

A1—1 to 7 inches; very dark brown (10YR 2/2) clay loam, brown (10YR 4/3) dry; strong fine and medium granular structure; very friable; many very fine and fine and common medium to very coarse roots throughout; common very fine and fine interstitial pores; few fine flakes of mica; 5 percent metasandstone channers by volume; extremely acid; clear wavy boundary.

A2—7 to 11 inches; dark brown (10YR 3/3) clay loam, dark yellowish brown (10YR 4/4) dry; moderate fine granular structure; friable; common very fine and fine and few medium and coarse roots throughout; few very fine and fine vesicular pores; few fine flakes of mica; 5 percent metasandstone channers by volume; extremely acid; clear smooth boundary.

Bw—11 to 19 inches; dark yellowish brown (10YR 4/6) loam; moderate medium subangular blocky structure; friable; few medium and coarse roots throughout; few very fine and fine vesicular pores; few fine flakes of mica; 10 percent metasandstone channers by volume; very strongly acid; clear smooth boundary.

BC—19 to 28 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium subangular blocky structure; friable; few fine flakes of mica; 10 percent metasandstone channers by volume; very strongly acid; clear wavy boundary.

C1—28 to 35 inches; yellowish brown (10YR 5/4) fine sandy loam; massive; very friable; few fine flakes of mica; 10 percent metasandstone channers by volume; very strongly acid; clear wavy boundary.

C2—35 to 54 inches; very pale brown (10YR 8/2), yellowish brown (10YR 5/4), gray (10YR 6/1), and black (10YR 2/1) fine sandy loam; massive; very friable; few fine flakes of mica; 10 percent metasandstone channers by volume; very strongly acid; clear smooth boundary.

Cr—54 to 80 inches; weathered, strongly cemented, metasandstone with high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 40 to 60 inches
Depth to bedrock: 40 to 60 inches to weathered bedrock
Content of mica flakes: None or few
Rock fragments (content, size): Less than 35 percent by volume; dominantly channers
Soil reaction: Extremely acid to strongly acid throughout the profile

A horizon:
Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—clay loam, fine sandy loam, or loam
Thickness—7 to 20 inches

AB horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4
Texture (fine-earth fraction)—clay loam, fine sandy loam, or loam

Bw horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam

BC horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, loamy fine sand, loamy sand, or loam

C horizon:
Color—horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—fine sandy loam, loam, sandy loam, loamy fine sand, or loamy sand saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, low-grade metasedimentary rock; moderate or high excavation difficulty
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Heintooga Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Colluvium derived from materials weathered from low-grade metasedimentary rock such as slate, phyllite, and thinly bedded metasandstone
Landscape: High mountains at Sandymush Bald
Landform: Coves and drainageways
Landform position: Footslopes and toeslopes
Slope range: 30 to 50 percent
Taxonomic classification: Loamy-skeletal, isotic, frigid Humic Dystrudepts

Typical Pedon

Heintooga very flaggy loam in an area of Chiltoskie-Heintooga complex, 30 to 50 percent slopes, very stony; in Swain County, North Carolina; from Bryson City, 9.9 miles east on U.S. Highway 19 to Cherokee, 2.8 miles north on U.S. Highway 441 into the Great Smoky Mountains National Parkway, 11.1 miles northeast on the Blue Ridge Parkway to Wolf Laurel Gap, 9.1 miles north on Balsam Mountain Road (Blue Ridge Parkway Extension) to the Balsam picnic area, 500 feet south-southeast of a parking area, on a forested toeslope; Bunches Bald USGS topographic quadrangle; lat. 35 degrees 34 minutes 17 seconds N. and long. 83 degrees 10 minutes 48 seconds W.; NAD 27:

Oe—0 to 1 inch; moderately decomposed leaves, twigs, roots, and other coniferous plant material.
A1—1 to 4 inches; very dark brown (10YR 2/2) very flaggy loam, very dark grayish brown (10YR 3/2) dry; moderate fine to very coarse granular structure; very friable; common very fine and fine and many medium to very coarse roots throughout;

common very fine to medium tubular pores; few fine flakes of mica; 25 percent by volume channers and 20 percent flagstones; ultra acid; abrupt wavy boundary.

A2—4 to 12 inches; dark brown (10YR 3/3) very flaggy loam, brown (10YR 4/3) dry; moderate very fine to coarse granular structure; friable; many medium to very coarse roots throughout; common very fine to medium and tubular pores; few fine flakes of mica; 25 percent by volume channers and 20 percent flagstones; extremely acid; gradual wavy boundary.

Bw1—12 to 25 inches; brown (10YR 4/3) extremely channery loam; moderate very fine to coarse subangular blocky structure; friable; common medium and coarse roots throughout; common very fine and fine and few medium pores; few fine flakes of mica; 60 percent by volume channers and 10 percent flagstones; extremely acid; gradual wavy boundary.

Bw2—25 to 80 inches; yellowish brown (10YR 5/6) extremely flaggy loam; weak fine to coarse subangular blocky structure; very friable; common medium to very coarse prominent yellowish red (5YR 4/6) mottles; few very fine tubular pores; few fine flakes of mica; 35 percent by volume channers and 35 percent flagstones; very strongly acid.

Range in Characteristics

Solum thickness: 40 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: None or few
Rock fragments (content, size): 35 to 80 percent by volume and typically increasing with depth; dominantly channers and flagstones
Soil reaction: Ultra acid to strongly acid throughout the profile

A horizon:
Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam
Thickness—10 to 20 inches

Bw horizon:
Color—hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 3 to 8; colors with value and chroma of 3 derived from parent material not organic matter content
Texture (fine-earth fraction)—loam, coarse sandy loam, sandy loam, or fine sandy loam

Hemphill Series

Depth class: Very deep
Drainage class: Very poorly drained
Depth to seasonal high water table: 1.0 foot or less from December through May and 0.5 foot to 1.5 feet from June through November
Permeability: Moderately slow in the surface layer, slow in the subsoil, and moderate in the underlying material
Parent material: Alluvium derived from materials weathered from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountain valleys of low mountains, dominantly in the Shelton Laurel and Spring Creeks areas and intermountain hills and low mountains in the northwestern and southeastern parts of the county
Landform: Low stream terraces
Landform position: Planar to slightly concave bottomland slopes
Slope range: 0 to 3 percent
Taxonomic classification: Fine, mixed, active, mesic Umbric Endoaqualfs

Typical Pedon

Hemphill clay loam, 0 to 3 percent slopes, rarely flooded; in Buncombe County, North Carolina; from Asheville, 0.8 mile south on U.S. Highway 25 (Biltmore Avenue), 1.8 miles southwest on U.S. Highway 25 (McDowell Avenue) to the Biltmore Estate entrance, 1.0 mile west on the estate road paralleling the Swannanoa River, 0.25 mile south on a farm road, 750 feet west of the farm road in a cultivated field; Asheville USGS topographic quadrangle; lat. 35 degrees 33 minutes 35 seconds N. and long. 82 degrees 33 minutes 53 seconds W.; NAD 27:

Ap—0 to 12 inches; very dark grayish brown (10YR 3/2) clay loam, dark grayish brown (10YR 4/2) dry; weak fine and medium granular structure; friable; non-sticky and non-plastic; common very fine and fine and few medium roots; common fine and few medium tubular pores; few fine and medium flakes of mica; slightly acid; clear smooth boundary.

BA—12 to 18 inches; dark gray (10YR 4/1) clay loam; few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate medium granular structure; friable; slightly sticky, slightly plastic; common very fine and fine and few medium roots; common fine and few medium tubular pores; few faint clay films on faces of peds; few fine and medium flakes of mica; slightly acid; gradual wavy boundary.

Btg1—18 to 26 inches; gray (10YR 5/1) clay; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; slightly sticky, slightly plastic; common very fine and fine and few medium roots between peds; common fine and few medium tubular pores; few distinct clay films on faces of peds; few fine and medium flakes of mica; moderately acid; gradual wavy boundary.

Btg2—26 to 48 inches; gray (2.5Y 5/1) clay; common fine distinct brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; firm; slightly sticky, slightly plastic; few very fine, fine, and medium roots between peds; few fine and medium tubular pores; few distinct clay films on faces of peds; common fine and medium flakes of mica; strongly acid; gradual wavy boundary.

BCg1—48 to 57 inches; gray (10YR 6/1) clay loam; common fine distinct brownish yellow (10YR 6/8) and few medium prominent strong brown (7.5YR 4/6) mottles; moderate coarse subangular blocky structure; friable; slightly sticky, slightly plastic; few fine and medium roots between peds; few fine and medium tubular pores; common fine and medium flakes of mica; moderately acid; gradual wavy boundary.

BCg2—57 to 80 inches; light brownish gray (10YR 6/2) fine sandy loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak medium platy structure; friable; non-sticky, non-plastic; few medium roots between peds; few fine tubular pores; common fine flakes of mica; moderately acid.

Range in Characteristics

Solum thickness: 40 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: None to common in the upper part of the profile and few to many in the lower part
Rock fragments (content, size): Less than 15 percent by volume
Soil reaction: Very strongly acid to neutral throughout the profile

Ap horizon:
Color—hue of 7.5YR to 2.5Y, value of 2 or 3, and chroma of 0 to 3
Texture (fine-earth fraction)—clay loam or silty clay loam
Thickness—7 to 14 inches

AB or BA horizon (if it occurs):

Color—horizon has hue of 7.5YR to 2.5Y, value of 2 or 3, and chroma of 0 or 3, or it is neutral in hue and has value of 2 or 3

Texture (fine-earth fraction)—clay loam, silty clay loam, or sandy clay loam

Btg horizon:

Color—horizon dominantly has hue of 7.5YR to 5Y, value of 2 or 6, and chroma of 0 or 2; in some pedons it has hue of 5GY, 5G, 5BG, or 5B, value of 4 to 7, and chroma of 1

Redoximorphic features—iron or clay depletions in shades of red, yellow, brown, olive, or gray

Texture (fine-earth fraction)—clay loam, silty clay loam, silty clay, or clay

BCg or CBg horizon (if it occurs):

Color—horizon dominantly has hue of 7.5YR to 5Y, value of 4 or 6, and chroma of 0 or 2, or it is neutral in hue and has value of 1 or 2; in some pedons, horizon has hue of 5GY, 5G, 5BG, or 5B, value of 4 to 7, and chroma of 1

Redoximorphic features—iron or clay depletions in shades of red, yellow, brown, olive, or gray

Texture (fine-earth fraction)—sandy loam, fine sandy loam, sandy clay loam, loam, silt loam, silty clay loam, silty clay, clay loam, or clay

Cg horizon (if it occurs):

Color—horizon dominantly has hue of 7.5YR to 5Y, value of 2 or 6, and chroma of 0 or 2, or it is neutral in hue and has value of 1 or 2; in some pedons, horizon has hue of 5GY, 5G, 5BG, or 5B, value of 4 to 7, and chroma of 1

Redoximorphic features—iron or clay depletions in shades of red, yellow, brown, olive, or gray

Texture (fine-earth fraction)—sand, sandy loam, fine sandy loam, sandy clay loam, loam, silt loam, or silty clay loam alluvium

Jeffrey Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part of the profile, weathered from low-grade metasedimentary rock such as interbedded metasandstone, phyllite, or quartzite
Landscape: Intermediate mountains in the northeastern and Sandymush Bald areas in the southwestern part of the county
Landform: Ridges, north- to east-facing hillslopes and mountain slopes and those slopes shaded by higher mountains
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Fine-loamy, isotic, mesic Typic Dystrudepts

Typical Pedon

Jeffrey loam in an area of Cheoah-Jeffrey complex, 30 to 50 percent slopes, stony; in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 10.5 miles north on U.S. Highway 25 & 70 to Hurricane, 4.1 miles north on North Carolina Highway 208 to Belva, 8.1 miles northeast on North Carolina Highway 212 to Hickey Fork, 1.2 miles northwest on Secondary Road 1310 to East Prong Hickey Fork, 1.8 miles northeast on U.S. Forest Service Road 465 and right on

Little Prong, 2.2 miles northeast on U.S. Forest Service Road 465 to a gate at Whiteoak Flats, 0.3 mile east on U.S. Forest Service Road 290, about 0.5 mile south on U.S. Forest Service Road 288, about 0.3 mile west on a logging road, 850 feet north of the road on a forested side slope; Greystone USGS topographic quadrangle; lat. 36 degrees 01 minute 10 seconds N. and long. 82 degrees 40 minutes 24 seconds W.; NAD 27:

Oe—0 to 2 inches; partially decomposed organic litter and root mat.

A1—2 to 6 inches; very dark grayish brown (10YR 3/2) loam, brown (10YR 4/3) dry; weak fine granular structure; very friable; many fine, common medium, and few very fine roots; few fine tubular pores; 10 percent by volume metasandstone and phyllite channers; very strongly acid; clear wavy boundary.

A2—6 to 10 inches; dark brown (10YR 3/3) loam, dark yellowish brown (10YR 4/4) dry; weak fine granular structure; very friable; common fine and medium roots; few fine tubular pores; 10 percent by volume metasandstone and phyllite channers; very strongly acid; clear wavy boundary.

Bw1—10 to 16 inches; dark yellowish brown (10R 4/6) channery loam; common distinct dark brown (10YR 3/3) organic matter staining on faces of peds; weak medium subangular blocky structure; friable; common very fine and fine and few medium roots; few fine tubular pores; 20 percent by volume metasandstone and phyllite channers; strongly acid; gradual wavy boundary.

Bw2—16 to 27 inches; dark yellowish brown (10YR 4/4) channery loam; weak medium subangular blocky structure; friable; few very fine, fine, and medium roots; few fine tubular pores; few very fine and fine flakes of mica; 20 percent by volume metasandstone and phyllite channers; strongly acid; clear wavy boundary.

Cr—27 to 33 inches; weathered, strongly cemented interbedded metasandstone and phyllite with high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart; gradual wavy boundary.

R—33 to 80 inches; unweathered, hard interbedded metasandstone and phyllite bedrock.

Range in Characteristics

Solum thickness: 18 to 35 inches
Depth to bedrock: 20 to 40 inches to hard bedrock
Content of mica flakes: None or few
Rock fragments (content, size): Less than 35 percent by volume in the A and B horizons and 15 to 50 percent in the C horizon; dominantly cobbles or gravel
Soil reaction: Strongly acid or very strongly acid throughout the profile

A horizon:
Color—hue of 10YR and value and chroma of 2 or 3
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy clay loam
Thickness—10 to 20 inches

Bw horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 3 to 6
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, or sandy clay loam

C horizon (if it occurs):
Color—hue of 10YR, value of 4 or 5, and chroma of 4 to 6
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, low-grade metasedimentary rock; moderate or high excavation difficulty

Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:

Type of bedrock—unweathered, hard, low-grade metasedimentary rock; very high or extremely high excavation difficulty

Junaluska Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock such as metasandstone or metaconglomerate
Landform: Low and intermediate mountains, dominantly in the Shelton Laurel, Shut-in Creek, and Walnut communities
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Fine-loamy, mixed, subactive, mesic Typic Hapludults

Typical Pedon

Junaluska loam in an area of Junaluska-Brasstown complex, 15 to 30 percent slopes; in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 10.5 miles north on U.S. Highway 25 & 70 to Hurricane, 4.1 miles north on North Carolina Highway 208 to Belva, 8.1 miles northeast on North Carolina Highway 212 to Hickey Fork, 1.2 miles northwest on Secondary Road 1310 to East Prong Hickey Fork, 1.8 miles northeast on U.S. Forest Service Road 465, about 0.4 mile north on U.S. Forest Service Road 293 along East Prong Hickey Fork, 0.8 mile west on Whiteoak Flat Trail, 300 feet south of the trail on a forested side slope; Greystone USGS topographic quadrangle; lat. 36 degrees 00 minutes 49 seconds N. and long. 82 degrees 42 minutes 12 seconds W.; NAD 27:

Oe—0 to 2 inches; moderately decomposed organic mat.
A—2 to 7 inches; dark yellowish brown (10YR 3/4) loam, grayish brown (10YR 5/2) dry; weak fine granular structure; very friable; common fine and medium and few coarse roots; 5 percent by volume gravel; very strongly acid; abrupt smooth boundary.
BA—7 to 11 inches; yellowish red (5YR 4/6) loam; weak fine subangular blocky structure; very friable; common very fine, fine, and medium and few coarse roots; few fine tubular pores; 5 percent by volume gravel; very strongly acid; clear wavy boundary.
Bt—11 to 22 inches; red (2.5YR 4/6) clay loam; few fine distinct red (10R 4/8) and few fine distinct yellowish red (5YR 4/6) mottles; moderate medium subangular blocky structure; friable; few very fine, fine, medium, and coarse roots; few fine tubular pores; few faint discontinuous clay films on faces of peds; few fine irregular black (5YR 2.5/1) manganese stains throughout; few fine flakes of mica; 10 percent by volume gravel; very strongly acid; gradual wavy boundary.
BC—22 to 29 inches; red (2.5YR 4/6) channery loam; common medium distinct red (10R 4/8) and few fine prominent yellow (10YR 7/8) mottles; weak coarse subangular blocky structure; friable; few fine, medium, and coarse roots; few fine tubular pores; few faint discontinuous clay films on faces of peds; few fine irregular black (5YR 2.5/1) manganese stains throughout; few fine flakes of mica; 10 percent by volume gravel; very strongly acid; gradual irregular boundary.
Cr—29 to 80 inches; weathered, strongly cemented metaconglomerate with high

excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 15 to 39 inches
Depth to bedrock: 20 to 40 inches to weathered bedrock
Content of mica flakes: Few or common
Rock fragments (content, size): Less than 35 percent by volume in the A, B, and C horizons; dominantly gravel, channers, and flagstones
Soil reaction: Extremely acid to moderately acid throughout the profile

A or Ap horizon:
Color—hue of 10YR to 5YR, value of 3 to 5, and chroma of 3 to 8; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—loam or fine sandy loam

BA horizon:
Color—hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam

Bt horizon:
Color—hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8; at least part of the horizon has hue of 2.5YR or 5YR
Texture (fine-earth fraction)—clay loam, loam, or sandy clay loam

BC horizon:
Color—hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam

C or CB horizon (if it occurs):
Color—multicolored in shades of red, brown, yellow, gray, or white
Texture (fine-earth fraction)—fine sandy loam, loam, sandy loam, or loamy fine sand
Other characteristics—thin parallel layers of saprolite and Bt horizon material may occur along fracture planes

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, low-grade metasedimentary rock; moderate or high excavation difficulty
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Keener Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid in the surface layer, moderate in the subsoil, and moderately rapid in the underlying material
Parent material: Colluvium derived from low-grade metasedimentary rock
Landscape: Low and intermediate mountains in the Grass Creek area on the Cocke County, Tennessee line in the western part of the county
Landform: Coves
Landform position: Footslopes
Slope range: 8 to 15 percent
Taxonomic classification: Fine-loamy, siliceous, semiactive, mesic Typic Hapludults

Typical Pedon

Keener loam, 20 to 35 percent slopes, stony; in Yancey County, North Carolina; from Burnsville, 3.5 miles west on U.S. Highway 19E, 2.0 miles west on Secondary Road 1454, about 21.3 miles west on U.S. Highway 19W, 1.5 miles north on U.S. Forest Service Road 278, about 0.6 mile north on U.S. Forest Service Road 5506, about 100 feet east in a stand of hemlock trees; Needy USGS topographic quadrangle; lat. 35 degrees 56 minutes 12 seconds N. and long. 83 degrees 06 minutes 02 seconds W.; NAD 27:

Oe—0 to 2 inches; moderately decomposed organic mat.

A—2 to 5 inches; brown (10YR 4/3) loam, yellowish brown (10YR 5/4) dry; weak fine granular structure; very friable; many very fine roots in mat at top and many medium roots throughout; many very fine and fine tubular pores; 10 percent by volume gravel; strongly acid; abrupt smooth boundary.

BE—5 to 18 inches; brown (10YR 5/3) loam; weak fine subangular blocky structure; friable; common fine and medium roots; many fine and medium tubular pores; 10 percent by volume gravel; strongly acid; abrupt smooth boundary.

Bt1—18 to 41 inches; yellowish brown (10YR 5/6) gravelly sandy clay loam; weak medium subangular blocky structure; friable; few fine and medium roots; few fine and medium tubular pores; few thin faint discontinuous clay films on faces of peds; distinct clay bridges between sand grains; distinct organic coats on faces of peds; 15 percent by volume gravel; strongly acid; clear wavy boundary.

Bt2—41 to 59 inches; yellowish brown (10YR 5/6) gravelly sandy clay loam; weak medium subangular blocky structure; friable; few fine to coarse roots; few fine and medium tubular pores; few thin faint clay films on faces of peds; distinct clay bridges between sand grains; very few discontinuous organic coats in root channels and pores; 15 percent by volume gravel; strongly acid; clear wavy boundary.

BC—59 to 80 inches; yellowish brown (10YR 5/6) gravelly fine sandy loam; common pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; few fine and medium roots; few very fine and fine tubular pores; 15 percent by volume gravel; strongly acid.

Range in Characteristics

Solum thickness: 40 to more than 60 inches

Depth to bedrock: More than 60 inches

Content of mica flakes: None

Rock fragments (content, size): Less than 35 percent by volume in the A horizon, less than 30 percent in the Bt horizon, and 10 to 50 percent in the BC and 2C horizons; dominantly gravel, channers, cobbles, or flagstones

Soil reaction: Extremely acid to moderately acid throughout the profile

A horizon:

Color—hue of 10YR, value of 3 or 4, and chroma of 2 to 4; where value is 3 or less, the horizon is less than 7 inches thick

Texture (fine-earth fraction)—loam or fine sandy loam

BE horizon:

Color—hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 or 8

Texture (fine-earth fraction)—loam

Bt horizon:

Color—hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 to 8

Texture (fine-earth fraction)—sandy clay loam, loam, or clay loam

BC horizon:
Color—hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 to 8
Texture (fine-earth fraction)—sandy loam, loam, fine sandy loam, sandy clay loam, clay loam, or sandy clay

C horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 to 8
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam colluvium

Mars Hill Series

Depth class: Deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic, high-grade metamorphic or igneous rock such as migmatitic gneiss
Landscape: Low and intermediate mountains, dominantly in the southeastern and south-central parts of the county
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Slope range: 8 to 95 percent
Taxonomic classification: Coarse-loamy, mixed, superactive, mesic, Dystric Eutrudepts

Typical Pedon

Mars Hill fine sandy loam in an area of Walnut-Oteen-Mars Hill complex, 30 to 50 percent slopes, moderately eroded; in Madison County, North Carolina; from Mars Hill, 4.3 miles south on Secondary Road 1001, about 1.2 miles southeast on Secondary Road 1114, about 0.5 mile east on Secondary Road 1116, about 0.3 mile southeast on Secondary Road 1115, about 0.3 mile northeast on a farm road to a gate, 200 feet northeast on a north-facing convex slope of 34 percent, in a pasture; Leicester USGS topographic quadrangle; lat. 35 degrees 44 minutes 15 seconds N. and long. 82 degrees 40 minutes 47 seconds W.; NAD 27:

Ap1—0 to 3 inches; dark yellowish brown (10YR 4/4) fine sandy loam, brown (10YR 5/3) dry; weak medium granular structure; very friable; common very fine roots throughout; few fine and medium interstitial and tubular pores; few fine flakes of mica; 5 percent by volume migmatitic gneiss gravel; strongly acid; abrupt smooth boundary.

Ap2—3 to 9 inches; dark yellowish brown (10YR 4/4) fine sandy loam, brown (10YR 5/3) dry; common medium distinct yellowish brown (10YR 5/6) mottles in interior of peds; weak coarse subangular blocky structure; very friable; common very fine roots throughout; few fine and medium tubular pores; common fine flakes of mica; 10 percent by volume migmatitic gneiss gravel; strongly acid; clear smooth boundary.

Bw1—9 to 16 inches; dark yellowish brown (10YR 4/6) fine sandy loam; weak fine subangular blocky structure; very friable; few very fine roots; few fine and medium tubular pores; common fine flakes of mica; 2 percent by volume migmatitic gneiss gravel; moderately acid; gradual wavy boundary.

Bw2—16 to 23 inches; dark yellowish brown (10YR 4/6) fine sandy loam; weak fine subangular structure; very friable; few very fine roots; few fine and medium tubular pores; common fine flakes of mica; 1 percent by volume migmatitic gneiss gravel; moderately acid; gradual wavy boundary.

BC—23 to 35 inches; dark yellowish brown (10YR 4/6) fine sandy loam; weak medium subangular blocky structure; very friable; few very fine roots; few very fine and fine tubular pores; common fine flakes of mica; 1 percent by volume migmatitic gneiss gravel; strongly acid; gradual irregular boundary.

C—35 to 46 inches; dark yellowish brown (10YR 4/6) fine sandy loam; massive; very friable; few very fine roots; few very fine and fine tubular pores; 2 percent by volume migmatitic gneiss gravel; strongly acid; clear irregular boundary.

Cr—46 to 80 inches; weathered, strongly cemented migmatitic gneiss with high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 20 to 40 inches
Depth to bedrock: 40 to 60 inches to weathered bedrock
Content of mica flakes: Few or common
Rock fragments (content, size): 0 to 35 percent in the A and B horizons and 0 to 40 percent in the C horizon; dominantly gravel
Soil reaction: Very strongly acid to neutral in the A horizon and strongly acid to neutral in the B and C horizons

A or Ap horizon:
Color—hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 6; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

Bw horizon:
Color—hue of 7.5YR to 2.5Y and value and chroma of 4 to 6
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

BC horizon:
Color—horizon has hue of 7.5YR to 2.5Y and value and chroma of 4 to 6 or may be mixed or mottled in these colors
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

C horizon:
Color—horizon has hue of 7.5YR to 5Y and value and chroma of 4 to 6 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, mixed felsic and mafic, high-grade metamorphic rock such as migmatitic gneiss, biotite-hornblende gneiss, and amphibolite; moderate or high excavation difficulty
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer (if it occurs):
Type of bedrock—unweathered, hard, mixed felsic and mafic, high-grade metamorphic rock such as migmatitic gneiss, biotite-hornblende gneiss, and amphibolite

Maymead Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid

Parent material: Colluvium derived from low-grade metasedimentary rock such as metasandstone, phyllite, or quartzite
Landscape: Low and intermediate mountains throughout the northwestern and north-central parts of the county
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes, footslopes, and toeslopes
Slope range: 2 to 50 percent
Taxonomic classification: Coarse-loamy, mixed, semiactive, mesic Typic Dystrudepts

Typical Pedon

Maymead loam in an area of Northcove-Maymead complex, 15 to 30 percent slopes, very stony; in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 10.5 miles north on U.S. Highway 25 & 70 to Hurricane, 4.1 miles north on North Carolina Highway 208 to Belva, 8.1 miles northeast on North Carolina Highway 212 to Hickey Fork, 1.2 miles northwest on Secondary Road 1310 to East Prong Hickey Fork, 1.8 miles northeast on U.S. Forest Service Road 465, about 0.4 mile north on U.S. Forest Service Road 293 along East Prong Hickey Fork, 0.4 mile west on Whiteoak Flat Trail to a parking area, 75 feet east on a forested convex area between drainageways; Greystone USGS topographic quadrangle; lat. 36 degrees 00 minutes 56 seconds N. and long. 82 degrees 41 minutes 56 seconds W.; NAD 27:

Oe—0 to 1 inch; moderately decomposed organic mat.
A—1 to 5 inches; very dark grayish brown (10YR 3/2) loam, brown (10YR 4/3) dry; weak fine granular structure; very friable; many very fine and fine, common medium, and few coarse roots; many very fine and fine tubular pores; 5 percent by volume channers and 3 percent cobbles; very strongly acid; clear smooth boundary.
Bw1—5 to 11 inches; dark yellowish brown (10YR 4/4) loam; weak fine subangular blocky structure; friable; common very fine, fine, and medium roots; common very fine and fine tubular pores; 5 percent by volume channers and 5 percent cobbles; very strongly acid; clear wavy boundary.
Bw2—11 to 34 inches; strong brown (7.5YR 4/6) channery loam; weak medium subangular blocky structure; friable; common very fine and fine roots; common very fine and fine tubular pores; 12 percent by volume channers and 6 percent cobbles; very strongly acid; gradual wavy boundary.
Bw3—34 to 47 inches; strong brown (7.5YR 5/8) cobbly sandy loam; weak fine subangular blocky structure; very friable; few fine roots; common very fine and fine tubular pores; 10 percent by volume channers, 10 percent cobbles, and 5 percent flagstones; very strongly acid; gradual wavy boundary.
Bw4—47 to 80 inches; brown (7.5YR 5/4) very flaggy sandy loam; weak medium subangular blocky structure; very friable; few very fine and common fine roots; few very fine and common fine tubular pores; 10 percent by volume channers, 10 percent cobbles, and 20 percent flagstones; strongly acid.

Range in Characteristics

Solum thickness: 40 to 70 inches
Depth to bedrock: More than 40 inches
Content of mica flakes: None
Rock fragments (content, size): Less than 35 percent by volume to a depth of 40 inches; below a depth of 40 inches, less than 60 percent coarse fragments; size and number generally increases with depth, ranging from channers to boulders
Soil reaction: Very strongly acid or strongly acid throughout the profile

A horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 2 to 3; where value is 3 or less, the horizon is less than 7 inches thick
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam

E horizon (if it occurs):
Color—hue of 10YR, value of 4 or 5, and chroma of 4 to 6
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam

Bw horizon:
Color—hue of 7.5YR to 10YR, value of 4 or 5, and chroma of 4 to 8
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam; thin subhorizons of sandy clay loam or clay loam occur in some pedons

C horizon (if it occurs):
Color—multicolored in shades of brown, yellow, black, and gray
Texture (fine-earth fraction)—sandy loam, fine sandy loam, loam, loamy sand, loamy fine sand, or coarse sandy loam colluvium

Northcove Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Colluvium derived from low-grade metasedimentary rock such as metasandstone, phyllite, or quartzite
Landscape: Low and intermediate mountains throughout the northwestern and north-central parts of the county
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes, footslopes, and toeslopes
Slope range: 2 to 50 percent
Taxonomic classification: Loamy-skeletal, mixed, semiactive, mesic Typic Dystrudepts

Typical Pedon

Northcove very cobbly loam in an area of Northcove-Maymead complex, 15 to 30 percent slopes, very stony; in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 10.5 miles north on U.S. Highway 25 & 70 to Hurricane, 4.1 miles north on North Carolina Highway 208 to Belva, 8.1 miles northeast on North Carolina Highway 212 to Hickey Fork, 1.2 miles northwest on Secondary Road 1310 to East Prong Hickey Fork, 1.8 miles northeast on U.S. Forest Service Road 465, about 0.4 mile north on U.S. Forest Service Road 293 along East Prong Hickey Fork, 0.4 mile west on Whiteoak Flat Trail to a parking area, 85 feet northwest in a forested area near Big Rocky Branch; Greystone USGS topographic quadrangle; lat. 36 degrees 00 minutes 57 seconds N. and long. 82 degrees 41 minutes 58 seconds W.; NAD 27:

Oe—0 to 1 inch; moderately decomposed organic mat.
A—1 to 4 inches; dark brown (10YR 3/3) very cobbly loam, dark yellowish brown (10YR 4/4) dry; weak fine granular structure; very friable; many very fine and fine and common medium roots; few fine and medium tubular pores; 15 percent by volume gravel, 20 percent cobbles, and 5 percent stones; very strongly acid; gradual smooth boundary.
BA—4 to 8 inches; dark yellowish brown (10YR 4/4) very cobbly loam; weak coarse subangular structure; very friable; common very fine, fine, and medium roots; few

fine tubular pores; 15 percent by volume gravel, 20 percent cobbles, and 5 percent stones; very strongly acid; gradual wavy boundary.

Bw1—8 to 29 inches; dark yellowish brown (10YR 4/6) very cobbly loam; weak medium subangular blocky structure; friable; common fine roots; few fine tubular pores; 15 percent by volume gravel, 20 percent cobbles, and 10 percent stones; very strongly acid; gradual wavy boundary.

Bw2—29 to 56 inches; brownish yellow (10YR 6/6) very cobbly loam; weak medium subangular blocky structure; very friable; common fine and few medium roots; 15 percent by volume gravel, 25 percent cobbles, and 15 percent stones; very strongly acid; gradual wavy boundary.

C—56 to 80 inches; light yellowish brown (10YR 6/4) very cobbly sandy loam; massive; very friable; few fine roots; few very fine and fine flakes of mica; 10 percent by volume gravel, 25 percent cobbles, and 20 percent stones; very strongly acid.

Range in Characteristics

Solum thickness: 35 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: None
Rock fragments (content, size): 35 to 60 percent by volume in the A and B horizons and 35 to 80 percent in the C horizon; amount typically increasing with depth; ranging from channers to boulders
Soil reaction: Extremely acid to moderately acid throughout the profile

A horizon:
Color—hue of 10YR or 7.5YR, value of 2 or 5, and chroma of 2 to 4; where value is 3 or less, the horizon is less than 7 inches thick
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam

BA or AB horizon (if it occurs):
Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam

Bw horizon:
Color—horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam

BC horizon (if it occurs):
Color—horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—loam, fine sandy loam, or fine sandy loam

C horizon:
Color—horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loamy sand colluvium

Oconaluftee Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate in the surface layer and moderately rapid in the subsoil and underlying material

Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock such as slate, phyllite, and thinly bedded metasandstone
Landscape: High mountains at Sandymush Bald
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Slope range: 8 to 95 percent
Taxonomic classification: Fine-loamy, isotic, frigid Humic Dystrudepts

Typical Pedon

Oconaluftee windswept, 50 to 95 percent slopes; in Jackson County, North Carolina; from Sylva, 0.6 mile north on Secondary Road 1513 (Grindstaff Cove Road), 10.85 miles northeast on U.S. Highway 74 & 23 to Balsam Gap on the Haywood County line, 16.5 miles south on the Blue Ridge Parkway to the west end of Bunches Bald tunnel, 400 feet south of the parkway on a forested side slope; Bunches Bald USGS topographic quadrangle; lat. 35 degrees 30 minutes 50 seconds N. and long. 83 degrees 11 minutes 36 seconds W.; NAD 27:

Oe—0 to 2 inches; partly decomposed organic litter and root mat.
A1—2 to 8 inches; black (10YR 2/1) channery loam, very dark grayish brown (10Y 3/2) dry; weak fine granular structure; very friable; many fine and medium roots throughout; many very fine and fine tubular and interstitial pores; common very fine and fine flakes of mica; 25 percent by volume phyllite and metasandstone channers and flagstones; extremely acid; clear wavy boundary.
A2—8 to 19 inches; dark brown (10YR 3/3) channery loam, brown (10YR 5/3) dry; weak medium granular structure; very friable; common fine and medium roots throughout; common very fine and fine tubular and interstitial pores; common very fine and fine flakes of mica; 20 percent by volume phyllite and metasandstone channers; strongly acid; clear wavy boundary.
Bw—19 to 35 inches; dark yellowish brown (10YR 4/4) channery fine sandy loam; weak medium subangular blocky structure; very friable; few fine and medium roots between peds; few very fine and fine tubular and interstitial pores; common fine flakes of mica; 20 percent by volume phyllite and metasandstone channers; very strongly acid; gradual wavy boundary.
C—35 to 80 inches; olive brown (2.5Y 4/4), white (10YR 8/2), gray (10YR 6/1), and black (10YR 2/1) channery fine sandy loam saprolite; massive; few fine and medium roots between peds in cracks; few very fine and fine tubular pores; common fine flakes of mica; 20 percent by volume phyllite and metasandstone channers; strongly acid.

Range in Characteristics

Solum thickness: 30 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few or common in the upper 40 inches of the profile
Rock fragments (content, size): Less than 35 percent by volume; dominantly channers and flagstones
Soil reaction: Extremely acid to moderately acid throughout the profile

A horizon:
Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—loam, fine sandy loam, or clay loam
Thickness—10 to 20 inches

AB horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4
Texture (fine-earth fraction)—loam, fine sandy loam, or silt loam

Bw horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—fine sandy loam, loam, or silt loam

BC horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—loam, fine sandy loam, or silt loam

C horizon:
Color—horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of brown, yellow, gray, or white
Texture (fine-earth fraction)—fine sandy loam, loam, silt loam, sandy loam, loamy fine sand, or loamy sandy saprolite

Oteen Series

Depth class: Shallow
Drainage class: Somewhat excessively drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic, high-grade metamorphic or igneous rock such as migmatitic gneiss
Landscape: Low and intermediate mountains, dominantly in the southeastern and south-central parts of the county
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Slope range: 8 to 95 percent
Taxonomic classification: Loamy, mixed, superactive, mesic, shallow, Dystric Eutrudepts

Typical Pedon

Oteen fine sandy loam in an area of Walnut-Oteen-Mars Hill complex, 30 to 50 percent slopes, moderately eroded; in Madison County, North Carolina; from Marshall, 4.3 miles south on Secondary Road 1001, about 1.2 mile southwest on Secondary Road 1114, about 0.5 mile northeast on Secondary Road 1116, about 0.3 mile east on Secondary Road 1115, about 0.3 mile northeast on a farm road to a gate, 500 feet northeast on a west-facing convex slope of 45 percent, in a pasture; Leicester USGS topographic quadrangle; lat. 35 degrees 44 minutes 17 seconds N. and long. 82 degrees 40 minutes 42 seconds W.; NAD 27:

Ap—0 to 2 inches; dark brown (10YR 3/3) fine sandy loam, yellowish brown (10YR 5/4) dry; weak fine granular structure; very friable; common very fine roots throughout; few fine and medium interstitial pores; common fine flakes of mica; 2 percent by volume migmatitic gneiss gravel; very strongly acid; clear smooth boundary.
Bw—2 to 11 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine subangular blocky structure; very friable; common very fine roots throughout; few fine and medium interstitial pores; common fine flakes of mica; 10 percent by volume migmatitic gneiss gravel; strongly acid; clear wavy boundary.
C—11 to 15 inches; dark yellowish brown (10YR 4/4) very gravelly sandy loam saprolite; massive; very friable; few very fine roots throughout; common medium interstitial pores; common fine flakes of mica; 38 percent by volume migmatitic gneiss gravel; moderately acid; gradual irregular boundary.
Cr—15 to 42 inches; weathered, strongly cemented migmatitic gneiss with high

excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart; gradual wavy boundary.

R—42 to 80 inches; unweathered, hard migmatitic gneiss bedrock.

Range in Characteristics

Solum thickness: 10 to 20 inches
Depth to bedrock: 10 to 20 inches to weathered bedrock
Content of mica flakes: Few or common
Rock fragments (content, size): 0 to 35 percent in the A and B horizons and 0 to 40 percent in the C horizon
Soil reaction: Strongly acid to neutral throughout the profile

A or Ap horizon:
Color—hue of 7.5YR to 2.5Y and value and chroma of 2 to 6; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

Bw horizon:
Color—hue of 7.5YR to 2.5Y and value and chroma of 4 to 6
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

C horizon:
Color—hue of 7.5YR to 5Y and value and chroma of 4 to 6
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, mixed felsic and mafic, high-grade metamorphic rock such as migmatitic gneiss, biotite-hornblende gneiss, and amphibolite; moderate or high excavation difficulty
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:
Type of bedrock—unweathered, hard, mixed felsic and mafic, high-grade metamorphic rock such as migmatitic gneiss, biotite-hornblende gneiss, and amphibolite

Porters Series

Depth class: Deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock such as granite and biotite gneiss
Landscape: Low and intermediate mountains, in the southwestern and eastern parts of the county
Landform: Ridges, north- to east-facing mountain slopes, and those slopes shaded by higher mountains
Landform position: Summits and side slopes
Slope range: 8 to 95 percent
Taxonomic classification: Fine-loamy, isotic, mesic Typic Dystrudepts

Typical Pedon

Porters loam in an area of Porters-Unaka complex, 30 to 50 percent, stony; in Madison

County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 16.5 miles northeast on U.S. Highway 25 & 70 to Hot Springs, 8.2 miles south on North Carolina Highway 209 (just south of Bluff), 6.1 miles southwest on Secondary Road 1175 to Joe, 4.1 miles west on Secondary Road 1181 to Little Creek Gap on the Haywood County line, 5.8 miles northeast on Secondary Road 1182 to Lemon Gap on the Tennessee State line, 0.6 mile northeast from an iron gate on U.S. Forest Service Road 3505, south of the road on a forested side slope; Lemon Gap USGS topographic quadrangle; lat. 35 degrees 49 minutes 30 seconds N. and long. 82 degrees 55 minutes 59 seconds W.; NAD 27:

Oe—0 to 1 inch; moderately decomposed organic mat.

A1—1 to 6 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) and brown (10YR 5/3) dry; weak fine granular structure; very friable; many very fine and fine, common medium, and few coarse roots; common very fine and fine tubular pores; few very fine flakes of mica; 3 percent by volume gravel and 7 percent cobbles; very strongly acid; clear smooth boundary.

A2—6 to 9 inches; dark brown (10YR 3/3) loam, brown (10YR 5/3) dry; weak medium granular structure; very friable; many very fine and fine, common medium, and few coarse roots; common very fine and fine tubular pores; few very fine flakes of mica; 3 percent by volume gravel and 7 percent cobbles; very strongly acid; clear wavy boundary.

BA—9 to 13 inches; brown (10YR 4/3) fine sandy loam; weak fine subangular blocky structure; friable; common very fine and few medium roots; few fine tubular pores; few very fine flakes of mica; 5 percent by volume gravel and 5 percent cobbles; very strongly acid; gradual wavy boundary.

Bw1—13 to 31 inches; dark yellowish brown (10YR 4/6) fine sandy loam; weak medium subangular blocky structure; friable; common very fine and few medium roots; few fine tubular pores; few very fine flakes of mica; 5 percent by volume gravel and 5 percent cobbles; very strongly acid; gradual wavy boundary.

Bw2—31 to 42 inches; yellowish brown (10YR 5/6) gravelly sandy loam; weak medium subangular blocky structure; friable; few very fine and fine flakes of mica; 12 percent by volume gravel and 5 percent cobbles; very strongly acid; gradual wavy boundary.

BC—42 to 51 inches; brown (7.5YR 5/4) cobbly sandy loam; weak coarse subangular blocky structure; friable; few very fine flakes of mica; 5 percent by volume gravel, 10 percent cobbles, and 5 percent stones; very strongly acid; gradual wavy boundary.

Cr—51 to 54 inches; weathered, strongly cemented Max Patch granite with high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart; abrupt smooth boundary.

R—54 to 80 inches; unweathered, hard Max Patch granite bedrock.

Range in Characteristics

Solum thickness: 20 to 50 inches

Depth to bedrock: 40 to 60 inches to hard bedrock

Content of mica flakes: Few or common in the A and B horizons and few to many in the C horizon

Rock fragments (content, size): Less than 15 percent by volume in the A horizon and the upper part of the Bw horizon and less than 35 percent in the lower part of the Bw horizon; ranging from gravel to stones

Soil reaction: Very strongly acid to slightly acid throughout the profile

A horizon:

Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3

Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam
Thickness—7 to 10 inches

AB horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam

BA horizon:
Color—hue of 7.5YR or 10YR, value of 4 to 5, and chroma of 3 to 6
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

Bw horizon:
Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam; sandy clay loam in some pedons

BC horizon:
Color—horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

C horizon (if it occurs):
Color—horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—loamy sand, loamy fine sand, sandy loam, fine sandy loam, or loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, felsic or mafic high-grade metamorphic or igneous rock; moderate or high excavation difficulty
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:
Type of bedrock—unweathered, hard, felsic or mafic high-grade metamorphic or igneous rock; very high or extremely high excavation difficulty

Reddies Series

Depth class: Very deep
Drainage class: Moderately well drained
Depth to seasonal high water table: 2.0 to 3.5 feet from December through May and 2.5 to 4.0 feet from June through November
Permeability: Moderately rapid in the A and B horizons and rapid or very rapid in the C horizon
Parent material: Recent alluvium that is coarse-loamy in the upper part of the profile and moderately deep to sandy or sandy-skeletal in the lower part, derived from materials weathered from felsic or mafic, high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountain valleys of low and intermediate mountains throughout the county
Landform: Flood plains dominantly at the upper end of mountain valleys
Landform position: Planar to slightly convex bottomland slopes
Slope range: 0 to 3 percent
Taxonomic classification: Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, mesic Oxyaquic Dystrudepts

Typical Pedon

Reddies sandy loam in an area of Dellwood-Reddies complex, 0 to 3 percent slopes, occasionally flooded; in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 10.5 miles north on U.S. Highway 25 & 70 to Hurricane, 4.1 miles north on North Carolina Highway 208 to Belva, 6.25 miles northeast on North Carolina Highway 212, about 75 feet north in a hayfield; White Rock USGS topographic quadrangle; lat. 35 degrees 58 minutes 44 seconds N. and long. 82 degrees 42 minutes 07 seconds W.; NAD 27:

Ap1—0 to 4 inches; very dark grayish brown (10YR 3/2) sandy loam, dark yellowish brown (10YR 3/4) dry; weak fine granular structure; very friable; many very fine roots in mat at top and many fine roots throughout; many very fine and fine tubular pores; common fine flakes of mica; 5 percent by volume gravel; slightly acid; clear smooth boundary.

Ap2—4 to 14 inches; dark brown (10YR 3/3) sandy loam, brown (10YR 4/3) dry; weak medium granular structure; very friable; many fine and coarse roots throughout; many very fine and fine tubular pores; common fine flakes of mica; 5 percent by volume gravel; slightly acid; clear wavy boundary.

Bw—14 to 28 inches; dark yellowish brown (10YR 4/6) fine sandy loam; weak medium subangular blocky structure; very friable; common fine and coarse roots throughout; common very fine and fine tubular pores; common fine flakes of mica; 8 percent by volume gravel and 4 percent cobbles; moderately acid; gradual wavy boundary.

C1—28 to 41 inches; dark yellowish brown (10YR 4/4) very cobbly fine sandy loam; massive; very friable; few very fine and medium roots at top of horizon; few very fine and medium tubular pores; many fine and common medium flakes of mica; 20 percent by volume gravel and 15 percent cobbles; moderately acid; clear irregular boundary.

C2—41 to 80 inches; multicolored very cobbly coarse loamy sand in shades of yellow, brown, and gray; single grain; loose; few very fine and medium roots at top of horizon; few very fine and medium tubular pores; many fine and common medium flakes of mica; 15 percent by volume gravel, 30 percent cobbles, and 5 percent stones; moderately acid.

Range in Characteristics

Solum thickness: 20 to 39 inches

Depth to contrasting material: 20 to 40 inches to deposits of cobbles and gravel that are stratified with sandy or loamy material

Depth to bedrock: More than 60 inches

Content of mica flakes: Few or common

Rock fragments (content, size): Less than 35 percent by volume in the A and B horizons and more than 35 percent in the C horizon; dominantly gravel or cobbles but including stones

Soil reaction: Very strongly acid to neutral throughout the profile

A or Ap horizon:

Color—hue of 7.5YR or 10YR and value and chroma of 2 or 3
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam
Thickness of A horizon—10 to 20 inches

Bw horizon:

Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8
Mottles (if they occur)—chroma of 2 or less; below a depth of 20 inches
Texture (fine-earth fraction)—fine sandy loam or sandy loam

C horizon:

Color—horizon has hue of 7.5YR to 2.5Y, value of 2 to 6, and chroma of 2 to 8, and it may be mixed or mottled in shades of these colors

Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive

Texture (fine-earth fraction)—loamy coarse sand, sand, or loamy sand alluvium

Rosman Series

Depth class: Very deep

Drainage class: Well drained

Depth to seasonal high water table: 3.5 to more than 6.0 feet from January through December

Permeability: Moderately rapid

Parent material: Recent alluvium that is coarse loamy in the upper part and deep to sandy material in the lower part, derived from materials weathered from felsic or mafic, high-grade metamorphic, igneous, or low-grade metasedimentary rock

Landscape: Mountain valleys, dominantly along Ivy, Shelton Laurel, and Spring Creeks and the French Broad River

Landform: Flood plains

Landform position: Planar to slightly convex bottomland slopes

Slope range: 0 to 3 percent

Taxonomic classification: Coarse-loamy, mixed, superactive, mesic Fluventic Humic Dystrudepts

Typical Pedon

Rosman fine sandy loam, 0 to 3 percent slopes, occasionally flooded; in Buncombe County, North Carolina; from Asheville, 5.1 miles east on Interstate 240, about 12.2 miles east on Interstate 40 to Black Mountain, turn on exit 64, about 13.7 miles south on North Carolina Highway 9, about 400 feet west of the highway in a pasture; Black Mountain USGS topographic quadrangle; lat. 35 degrees 30 minutes 36 seconds N. and long. 82 degrees 16 minutes 41 seconds W.; NAD 27:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) fine sandy loam, brown (10YR 4/3) dry; weak medium granular structure; very friable; many very fine and fine and common medium roots; many very fine and common medium tubular pores; common fine flakes of mica; moderately acid; clear smooth boundary.

A—9 to 12 inches; dark brown (10YR 3/3) fine sandy loam, brown (10YR 5/3) dry; weak medium granular structure; very friable; common very fine and fine and few medium roots; many very fine and common medium tubular pores; common fine flakes of mica; moderately acid; clear smooth boundary.

Bw1—12 to 32 inches; yellowish brown (10YR 5/6) fine sandy loam; weak fine subangular blocky structure; very friable; few very fine and fine roots; common medium tubular pores; common very fine and fine flakes of mica; slightly acid; gradual wavy boundary.

Bw2—32 to 47 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium subangular blocky structure; very friable; common very fine and fine roots; common medium tubular pores; many fine flakes of mica; slightly acid; gradual wavy boundary.

Bw3—47 to 58 inches; yellowish brown (10YR 5/4) fine sandy loam; few medium distinct dark brown (10YR 4/3) mottles in the lower portion; massive; very friable; few very fine and fine roots; common medium tubular pores; common fine flakes of mica; slightly acid; clear wavy boundary.

C1—58 to 71 inches; 65 percent dark yellowish brown (10YR 5/4) and 35 percent dark grayish brown (10YR 4/2) loamy sand; massive; very friable; few very fine roots; few fine tubular pores; common fine flakes of mica; moderately acid; clear wavy boundary.

C2—71 to 80 inches; dark yellowish brown (10YR 5/4) sand; single grain; loose; few very fine roots; common fine tubular pores; many fine flakes of mica; slightly acid.

Range in Characteristics

Solum thickness: 35 to more than 60 inches
Depth to contrasting material: 40 to 60 inches or more to sand and more than 60 inches to deposits of gravel and cobbles that are stratified with sandy or loamy material
Depth to bedrock: More than 60 inches
Content of mica flakes: Few to many
Rock fragments (content, size): Less than 15 percent by volume to a depth of 40 inches and less than 50 percent below a depth of 40 inches; dominantly gravel
Soil reaction: Strongly acid to neutral throughout the profile

Ap or A horizon:
Color—hue of 7.5YR to 2.5Y, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam
Thickness of A horizon—10 to 20 inches

Bw horizon:
Color—hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive below a depth of 24 inches
Texture (fine-earth fraction)—fine sandy loam, sandy loam, very fine sandy loam, or loam

C horizon:
Color—hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 8
Redoximorphic features (if they occur)—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—loamy sand, sand, coarse sand, fine sand, coarse sandy loam, sandy loam, fine sandy loam, or loam alluvium; in some pedons, strata containing 15 to 50 percent gravel and cobbles are below a depth of 40 inches

Soco Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock such as metasandstone
Landscape: Low and intermediate mountains, dominantly in the northwestern and northern parts of the county
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Coarse-loamy, mixed, active, mesic Typic Dystrudepts

Typical Pedon

Soco fine sandy loam in an area of Soco-Stecoah complex, 30 to 50 percent slopes, stony; in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 10.5 miles north on U.S. Highway 25 & 70 to Hurricane, 2.1 miles west on U.S. Highway 25 & 70 to Tanyard Gap, 1.4 miles south on U.S. Forest Service Road 113, about 0.15 mile south on U.S. Forest Service Road 3515, about 15 feet above the road on a forested side slope; Hot Springs USGS topographic quadrangle; lat. 35 degrees 54 minutes 03 seconds N. and long. 82 degrees 47 minutes 35 seconds W.; NAD 27:

Oe—0 to 1 inch; moderately decomposed organic mat.

A—1 to 3 inches; very dark grayish brown (10YR 3/2) fine sandy loam, dark yellowish brown (10YR 4/4) dry; weak fine granular structure; very friable; many very fine and fine, common medium, and few coarse roots; many very fine and fine and common medium and coarse tubular pores; few very fine flakes of mica; 8 percent by volume channers and 2 percent flagstones; extremely acid; clear smooth boundary.

BA—3 to 6 inches; brown (10YR 4/3) fine sandy loam; weak fine subangular blocky structure; friable; common very fine, fine, and medium and few coarse roots; common very fine to coarse tubular pores; few very fine flakes of mica; 5 percent by volume channers and 5 percent flagstones; very strongly acid; gradual wavy boundary.

Bw1—6 to 17 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak medium subangular blocky structure; friable; common very fine, fine, and medium and few coarse roots; common very fine to coarse tubular pores; few very fine flakes of mica; 5 percent by volume channers and 5 percent flagstones; very strongly acid; gradual wavy boundary.

Bw2—17 to 26 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak fine subangular blocky structure; friable; few fine, medium, and coarse roots; common very fine to coarse tubular pores; few very fine flakes of mica; 15 percent by volume channers and 5 percent flagstones; strongly acid; gradual wavy boundary.

BC—26 to 34 inches; light yellowish brown (10YR 6/4) fine sandy loam; common medium distinct yellowish brown (10YR 5/6) and few medium pale brown (10YR 6/3) mottles; weak fine subangular blocky structure; very friable; few medium and coarse roots; few very fine to medium tubular pores; few very fine flakes of mica; 15 percent by volume channers and 5 percent flagstones; very strongly acid; gradual wavy boundary.

Cr—34 to 80 inches; weathered, strongly cemented metasandstone with high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 15 to 39 inches
Depth to bedrock: 20 to 40 inches to weathered bedrock
Content of mica flakes: None to common throughout the profile
Rock fragments (content, size): 5 to less than 35 percent by volume; dominantly gravel or cobbles
Soil reaction: Extremely acid to strongly acid throughout the profile

A or Ap horizon:
Color—hue of 7.5YR to 2.5Y, value of 2 to 5, and chroma of 1 to 6; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—fine sandy loam or loam

BA or AB horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—fine sandy loam, sandy loam, very fine sandy loam, or loam

Bw horizon:
Color—hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—fine sandy loam, sandy loam, very fine sandy loam, or loam

BC horizon:
Color—hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—fine sandy loam, sandy loam, very fine sandy loam, or loam

C horizon (if it occurs):
Color—horizon has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—loamy sand, loamy fine sand, sandy loam, fine sandy loam, or loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, low-grade metasedimentary rock; moderate or high excavation difficulty
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Statler Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: 4.0 to 6.0 feet from January through December
Permeability: Moderate
Parent material: Old alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountain valleys of low mountains, dominantly along Shelton Laurel and Spring Creeks, in the northwestern parts of the county and in the intermountain hills of southeastern parts of the county
Landform: Low stream terraces
Landform position: Concave to planar toeslopes
Slope range: 1 to 5 percent
Taxonomic classification: Fine-loamy, mixed, active, mesic Humic Hapludults

Typical Pedon

Statler loam, 1 to 5 percent slopes, rarely flooded; in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 10.1 miles northwest on U.S. Highways 25 & 70, about 3.6 miles north on N.C. Highway 208, about 9.6 miles northeast on N.C. Highway 212, about 560 feet southeast on a farm road, 20 feet south in a cultivated field; White Rock USGS topographic quadrangle; lat. 35 degrees 59 minutes 37.1 seconds N. and long. 82 degrees 39 minutes 21.7 seconds W.; NAD 27:

Ap—0 to 7 inches; dark yellowish brown (10YR 3/4) loam, yellowish brown (10YR 5/4) dry; weak fine granular structure; very friable; common fine and medium roots; common very fine and fine pores; 2 percent by volume rounded quartz gravel; few fine flakes of mica; slightly acid; clear wavy boundary.

Bt1—7 to 15 inches; dark yellowish brown (10YR 4/6) clay loam; moderate medium subangular blocky structure; friable; few very fine and fine roots; common fine and medium pores; few faint discontinuous yellowish brown (10YR 5/4) clay films on faces of peds; 5 percent by volume rounded quartz gravel; common fine flakes of mica; slightly acid; gradual wavy boundary.

Bt2—15 to 27 inches; dark yellowish brown (10YR 4/6) clay loam; few fine prominent yellowish red (5YR 5/6) and common medium distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; few very fine and fine roots; few fine and medium pores; few faint discontinuous dark yellowish brown (10YR 4/4) clay films on faces of peds; 5 percent by volume rounded quartz gravel; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bt3—27 to 39 inches; dark yellowish brown (10YR 4/6) clay loam; few fine prominent yellowish red (5YR 5/6) and common medium distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; few very fine and fine roots; few fine and medium pores; few faint discontinuous dark yellowish brown (10YR 4/4) clay films on faces of peds; 5 percent by volume rounded quartz gravel; few fine flakes of mica; strongly acid; gradual wavy boundary.

BC—39 to 54 inches; dark yellowish brown (10YR 4/6) loam; few fine prominent yellowish red (5YR 5/8) and common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine and medium pores; 2 percent by volume rounded quartz gravel; common fine flakes of mica; strongly acid; gradual wavy boundary.

C—54 to 80 inches; dark yellowish brown (10YR 4/6) loam; common medium distinct brown (10YR 5/3) mottles; massive; very friable; 2 percent by volume rounded quartz gravel; common fine flakes of mica; strongly acid.

Range in Characteristics

Solum thickness: 30 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: None or few
Rock fragments (content, size): Less than 15 percent by volume in the A or Ap and Bt horizons and less than 35 percent in the C horizon
Soil reaction: Strongly acid or moderately acid throughout the profile, except where surface layers have been limed

Ap horizon:
Color—hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 2 to 4
Texture (fine-earth fraction)—loam or fine sandy loam
Thickness—7 to 10 inches

Bt horizon:
Color—hue of 10YR to 5YR, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—clay loam, loam, or sandy clay loam

BC horizon:
Color—hue of 10YR to 5YR, value of 4 to 6, and chroma of 3 to 8
Redoximorphic features (if they occur)—iron or clay depletions in shades of brown, yellow, or gray; iron accumulations in shades of brown or yellow
Texture (fine-earth fraction)—loam or fine sandy loam

C horizon:
Color—hue of 10YR to 5Y, value of 4 to 6, and chroma of 3 to 8
Redoximorphic features (if they occur)—iron or clay depletions in shades of brown, yellow, or gray; iron accumulations in shades of brown or yellow
Texture (fine-earth fraction)—loam or fine sandy loam alluvium

Stecoah Series

Depth class: Deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock such as metasandstone
Landscape: Low and intermediate mountains, dominantly in the northwestern and northern parts of the county
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Coarse-loamy, mixed, active, mesic Typic Dystrudepts

Typical Pedon

Stecoah fine sandy loam in an area of Soco-Stecoah complex, 50 to 95 percent slopes, stony; in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 10.5 miles north on U.S. Highway 25 & 70 to Hurricane, 2.1 miles west on U.S. Highway 25 & 70 to Tanyard Gap, 1.4 miles south on U.S. Forest Service Road 113, about 0.15 mile south on U.S. Forest Service Road 3515, about 15 feet above the road on a forested side slope; Hot Springs USGS topographic quadrangle; lat. 35 degrees 53 minutes 59 seconds N. and long. 82 degrees 47 minutes 32 seconds W.; NAD 27:

Oe—0 to 1 inch; moderately decomposed organic mat.

A—1 to 3 inches; very dark grayish brown (10YR 3/2) fine sandy loam, dark yellowish brown (10YR 4/4) dry; weak fine granular structure; very friable; many very fine and fine, common medium, and few coarse roots; many very fine to medium and common coarse tubular pores; 5 percent by volume channers and 2 percent flagstones; very strongly acid; clear smooth boundary.

BA—3 to 6 inches; brown (10YR 5/3) fine sandy loam; weak medium granular structure; friable; common very fine to medium and few coarse roots; common very fine to medium and few coarse tubular pores; 5 percent by volume channers; strongly acid; gradual wavy boundary.

Bw1—6 to 24 inches; light yellowish brown (10YR 6/4) sandy loam; weak fine subangular blocky structure; friable; common very fine to medium and few coarse roots; common very fine to medium tubular pores; few fine flakes of mica; 5 percent by volume channers; very strongly acid; gradual wavy boundary.

Bw2—24 to 34 inches; light yellowish brown (10YR 6/4) sandy loam; few medium distinct strong brown (7.5YR 4/6), common fine faint light gray (10YR 7/2), and common fine faint brownish yellow (10YR 6/8) mottles; weak fine subangular blocky structure; friable; few very fine to medium and few coarse roots; common very fine to medium tubular pores; few very fine flakes of mica; 5 percent by volume channers; very strongly acid; gradual wavy boundary.

BC—34 to 48 inches; yellowish brown (10YR 5/8) sandy loam; few medium distinct strong brown (7.5YR 4/6), common fine faint light gray (10YR 7/2), and common fine faint brownish yellow (10YR 6/8) mottles; weak coarse subangular blocky structure; friable; few very fine to coarse roots; few very fine to coarse tubular pores; few very fine flakes of mica; 10 percent by volume channers; very strongly acid; gradual irregular boundary.

Cr—48 to 80 inches; weathered, strongly cemented metasandstone interbedded with phyllite with high excavation difficulty; few seams of multicolored channery fine sandy loam in cracks; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 24 to 50 inches
Depth to bedrock: 40 to 60 inches to weathered bedrock
Content of mica flakes: None to common throughout the profile
Rock fragments (content, size): Less than 35 percent by volume; dominantly channers
Soil reaction: Extremely acid to strongly acid throughout the profile

A horizon:
Color—hue of 7.5YR to 2.5Y, value of 2 to 5, and chroma of 1 to 6; where value is 3 or less, the horizon is less than 7 inches thick
Texture (fine-earth fraction)—fine sandy loam or loam

BA or E horizon (if it occurs):
Color—hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 or 4
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

Bw horizon:
Color—hue of 5YR or 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

BC horizon:
Color—horizon has hue of 5YR or 2.5Y, value of 4 to 6, and chroma of 3 to 8 or is mixed or mottled in shades of these colors; colors with chroma of 2 or less are inherited from the parent material and are not caused by wetness
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam; some pedons have pockets of loamy sand or sandy loam saprolite

C horizon (if it occurs):
Color—horizon has hue of 5YR or 2.5Y, value of 4 to 6, and chroma of 3 to 8 or is mixed or mottled in shades of these colors; colors with chroma of 2 or less are inherited from the parent material and are not caused by wetness
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, loamy fine sand, or loamy sand saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, low-grade metasedimentary rock; moderate or high excavation difficulty
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Sylco Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock such as slate, phyllite, metasiltstone, and thinly bedded metasandstone
Landscape: Low and intermediate mountains in the northwestern and north-central parts of the county
Landform: Ridges and south-to-west facing mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Loamy-skeletal, mixed, active, mesic, Typic Dystrudepts

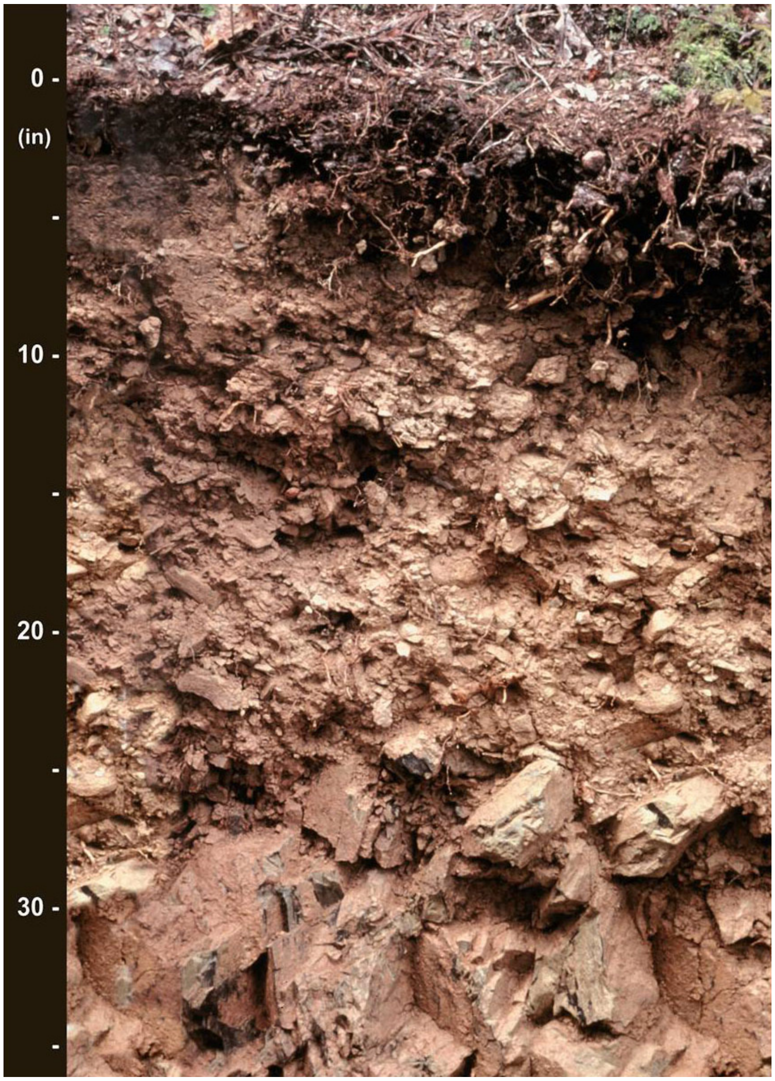

Figure 24.—Typical profile of Sylco very channery loam. Sylco soils are moderately deep to unweathered, thinly layered bedrock. They occur on low or intermediate mountains, predominantly in the north-central and northeastern parts of Madison County.

Typical Pedon

Sylco channery loam in an area of Sylco-Soco complex, 50 to 95 percent slopes, very stony (fig. 24); in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 10.5 miles north on U.S. Highway 25 & 70 to Hurricane, 1.1 miles west on U.S. Highway 25 & 70 to old U.S. Highway 25 & 70, about 0.5 mile west to U.S. Forest Service Road 476 (Rich Mountain Road), 4.1 miles northwest to Hurricane Gap on the Tennessee-North Carolina State line, 0.15 mile south on U.S. Forest Service Road 476-A to a logging road, 0.3 mile southeast to the logging road, 0.15 mile northeast, 10 feet above the road in a west-facing cut slope; USGS Hot Springs topographic quadrangle; lat. 35 degrees 56 minutes 05 seconds N. and long. 82 degrees 48 minutes 06 seconds W.; NAD 27:

Oe—0 to 2 inches; moderately decomposed organic mat.
A1—2 to 4 inches; dark yellowish brown (10YR 3/4) channery loam, dark yellowish

brown (10YR 4/6) dry; weak fine granular structure; very friable; many very fine and fine, common medium, and few coarse roots; common very fine and fine tubular pores; 15 percent by volume channers and 5 percent flagstones; very strongly acid; clear smooth boundary.

A2—4 to 7 inches; dark yellowish brown (10YR 4/4) very channery loam, yellowish brown (10YR 5/4) dry; weak fine granular structure; very friable; many very fine and fine, common medium, and few coarse roots; common very fine and fine tubular pores; 20 percent by volume channers and 5 percent flagstones; very strongly acid; clear smooth boundary.

Bw1—7 to 15 inches; brown (7.5YR 5/4) very channery loam; weak fine subangular blocky structure; friable; common very fine and fine and medium roots; common very fine and fine tubular pores; 30 percent by volume channers and 15 percent flagstones; very strongly acid; gradual wavy boundary.

Bw2—15 to 25 inches; strong brown (7.5YR 5/6) very channery loam; weak fine subangular blocky structure; friable; common very fine and fine and medium roots; common very fine and fine tubular pores; 20 percent by volume channers and 25 percent flagstones; very strongly acid; gradual irregular boundary.

Cr—25 to 33 inches; weathered, strongly cemented interbedded slate and phyllite with high excavation difficulty; few fine and medium few thin seams of dark yellowish brown (10YR 4/6) loam in cracks; few roots in cracks that are spaced more than 4 inches apart; strongly acid; gradual irregular boundary.

R—33 to 80 inches; unweathered, hard interbedded slate and phyllite bedrock.

Range in Characteristics

Solum thickness: 17 to 39 inches
Depth to bedrock: 20 to 40 inches
Content of mica flakes: None
Rock fragments (content, size): 10 to 50 percent by volume in the A horizon, 15 to 45 percent in the B horizon, and 40 to 70 percent or more in the C horizon; average content of these fragments between 10 inches and bedrock ranges from 35 to 50 percent; dominantly channers and flagstones
Soil reaction: Extremely acid to strongly acid throughout the profile

A1 horizon:
Color—hue of 10YR, value of 3 or 4, and chroma of 2 to 4; where value is 3 or less, the horizon is less than 7 inches thick
Texture (fine-earth fraction)—loam or silt loam

A2 horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 3 to 4; where value is 3 or less, the horizon is less than 7 inches thick
Texture (fine-earth fraction)—loam or silt loam

Bw horizon:
Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 to 8
Texture (fine-earth fraction)—loam, silt loam, or silty clay loam

C horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 to 8
Texture (fine-earth fraction)—loam, silt loam, or silty clay loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, low-grade metasedimentary rock; moderate or high excavation difficulty
Other charactertistics—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:

Type of bedrock—unweathered, hard, low-grade metasedimentary rock; very high or extremely high excavation difficulty

Tate Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid in the surface layer, moderate in the subsoil, and moderately rapid in the underlying material
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock such as hornblende gneiss and biotite gneiss
Landscape: Intermountain hills and low mountains in the western, southern, and eastern parts of the county
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes, footslopes, and toeslopes
Slope range: 2 to 30 percent
Taxonomic classification: Fine-loamy, mixed, semiactive, mesic Typic Hapludults

Typical Pedon

Tate loam, 8 to 15 percent slopes; in Madison County, North Carolina; from Marshall, 14.1 miles southwest on Secondary Road 1001 to the Buncombe County line, 1.4 miles south on Secondary Road 1001, about 2.3 miles west on North Carolina Highway 63 to Canto on the Buncombe-Madison County line, 2.4 miles west on North Carolina Highway 63 into Madison County, 0.3 mile along a farm road, in a pasture; Sandymush USGS topographic quadrangle; lat. 35 degrees 42 minutes 32 seconds N. and long. 82 degrees 47 minutes 48 seconds W.; NAD 27:

Ap—0 to 9 inches; brown (10YR 4/3) loam, yellowish brown (10YR 5/4) dry; moderate medium granular structure; very friable; many very fine and fine roots; many very fine and medium tubular pores; few fine flakes of mica; 2 percent by volume gravel; moderately acid; abrupt smooth boundary.

Bt1—9 to 28 inches; yellowish brown (10YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; common very fine and many fine roots; many fine and medium tubular pores; discontinuous faint dark yellowish brown (10YR 4/6) clay films on faces of peds and surfaces of rock fragments; few fine flakes of mica; 3 percent by volume gravel; moderately acid; gradual wavy boundary.

Bt2—28 to 42 inches; yellowish brown (10YR 5/4) sandy clay loam; moderate medium subangular blocky structure; friable; few very fine and fine roots; common fine and medium tubular pores; discontinuous faint brownish yellow (10YR 6/6) clay films on faces of peds; few fine flakes of mica; 3 percent by volume gravel; strongly acid; gradual wavy boundary.

BC—42 to 56 inches; brownish yellow (10YR 6/6) gravelly sandy clay loam; common medium faint yellowish brown (10YR 5/6) and few medium prominent reddish yellow (7.5YR 6/6) mottles; weak medium subangular blocky structure; friable; few very fine and fine roots; few fine and medium tubular pores; patchy faint clay bridges between sand grains; common fine and medium and few coarse flakes of mica; 12 percent by volume gravel and 5 percent cobbles; strongly acid; gradual wavy boundary.

C—56 to 80 inches; brownish yellow (10YR 6/8) cobbly sandy loam; common medium distinct strong brown (7.5YR 5/6) and few medium prominent yellowish red (5YR 5/6) mottles; massive; friable; few very fine and fine roots; few fine and medium tubular pores; common fine, medium, and coarse flakes of mica; 8 percent by volume gravel and 12 percent cobbles; strongly acid.

Range in Characteristics

Solum thickness: 24 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: None or common throughout the profile
Rock fragments (content, size): Less than 35 percent by volume in the A and Bt horizons and less than 60 percent in the BC and C horizons; ranging from gravel to stones
Soil reaction: Very strongly acid to slightly acid throughout the profile, except where surface layers have been limed

Ap or A horizon:
Color—hue of 10YR, value of 2 or 3, and chroma of 2 to 4; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam

Bt horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—clay loam, loam, or sandy clay loam

BC horizon:
Color—horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—sandy clay loam, fine sandy loam, loam, clay loam, or sandy loam

C horizon:
Color—horizon has hue of 7.5YR or 2.5Y, value of 4 to 6, and chroma of 4 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam colluvium

Toecane Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock such as granite, hornblende gneiss, and biotite gneiss
Landscape: Low and intermediate mountains, dominantly in the western, southern, and eastern parts of the county
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes, footslopes, and toeslopes
Slope range: 8 to 50 percent
Taxonomic classification: Loamy-skeletal, mixed, active, mesic Humic Hapludults

Typical Pedon

Toecane cobbly loam in an area of Toecane-Tusquitee complex, 15 to 30 percent slopes, very bouldery; in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 16.5 miles northeast on U.S. Highway 25 & 70 to Hot Springs, 8.2 miles south on North Carolina Highway 209 (just south of Bluff), 6.1 miles southwest on Secondary Road 1175 to Joe, 41 miles west on Secondary Road 1181 to Little Creek Gap on the Haywood County line, 2.1 miles north on Secondary Road 1182 along the Tennessee State line to Max Patch trail head on the

Appalachian Trail, approximately 1,000 feet northeast on the U.S. Forest Service road, 20 feet east-northeast of the road, in woodland; Lemon Gap USGS topographic quadrangle; lat. 35 degrees 48 minutes 3.0 seconds N. and long. 82 degrees 57 minutes 28.5 seconds W.; NAD 27:

Oe—0 to 2 inches; moderately decomposed organic mat.

A1—2 to 6 inches; black (10YR 2/1) cobbly loam, very dark grayish brown (10YR 3/2) dry; weak fine granular structure; very friable; many very fine and fine and few medium roots; few fine and medium pores; common very fine flakes of mica; 10 percent by volume gravel and 5 percent cobbles; very strongly acid; clear smooth boundary.

A2—6 to 9 inches; very dark grayish brown (10YR 3/2) very cobbly loam, dark brown (10YR 3/3) dry; weak medium granular structure; very friable; many very fine and fine roots; few very fine and fine tubular pores; common very fine and fine flakes of mica; 15 percent by volume gravel and 10 percent cobbles; strongly acid; gradual wavy boundary.

Bt1—9 to 13 inches; dark yellowish brown (10YR 3/6) very cobbly loam; weak medium subangular blocky structure; friable; common very fine and fine roots; few fine tubular pores; few very fine and fine flakes of mica; 15 percent by volume gravel and 20 percent cobbles; strongly acid; gradual wavy boundary.

Bt2—13 to 24 inches; yellowish brown (10YR 5/4) very cobbly sandy clay loam; weak medium subangular blocky structure; friable; common very fine and fine roots; few very fine and fine flakes of mica; 15 percent by volume gravel, 20 percent cobbles, and 5 percent stones; very strongly acid; gradual wavy boundary.

BC—24 to 37 inches; dark yellowish brown (10YR 4/6) very cobbly sandy loam; weak medium subangular blocky structure; very friable; few fine roots; few very fine and fine flakes of mica; 15 percent by volume gravel, 20 percent cobbles, and 10 percent stones; strongly acid; gradual wavy boundary.

C—37 to 80 inches; dark yellowish brown (10YR 4/4) extremely cobbly loamy sand; massive; few fine roots; few very fine and fine flakes of mica; 15 percent by volume gravel, 30 percent cobbles, and 20 percent stones; strongly acid.

Range in Characteristics

Solum thickness: 30 to more than 60 inches

Depth to bedrock: More than 60 inches

Content of mica flakes: Few or common in the A and B horizons and few to many in the C horizon

Rock fragments (content, size): 15 to 60 percent by volume in the A and B horizons and 35 to 80 percent in the C horizon; content typically increasing with depth; ranging from gravel to boulders

Soil reaction: Extremely acid to moderately acid throughout the profile

A horizon:

Color—hue of 7.5YR to 2.5Y, value of 2 or 3, and chroma of 1 to 3

Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, or sandy clay loam

Thickness—7 to 10 inches

AE or AB horizon (if it occurs):

Color—hue of 7.5YR to 2.5Y, value of 2 or 3, and chroma of 1 to 3

Texture (fine-earth fraction)—loam, fine sandy loam, sandy loam, or sandy clay loam

Bt horizon:

Color—horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors

Texture (fine-earth fraction)—loam, sandy clay loam, sandy loam, or fine sandy loam

BC horizon:

Color—horizon has hue of 7.5YR to 2Y, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—sandy loam, loamy sand, loamy fine sand, coarse sandy loam, fine sandy loam, or loam

C horizon:

Color—horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—loamy sand, loamy fine sand, coarse sandy loam, sandy loam, fine sandy loam, or sand; thin layers of loam colluvium occur in some pedons

Tusquitee Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock such as granite, hornblende gneiss, and biotite gneiss
Landscape: Low and intermediate mountains, dominantly in the western, southern, and eastern parts of the county
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes, footslopes, and toeslopes
Slope range: 8 to 50 percent
Taxonomic classification: Fine-loamy, isotic, mesic Typic Dystrudepts

Typical Pedon

Tusquitee gravelly loam in an area of Toecane-Tusquitee complex, 15 to 30 percent slopes, very bouldery (fig. 25); in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 16.5 miles northeast on U.S. Highway 25 & 70 to Hot Springs, 8.2 miles south on North Carolina Highway 209 (just south of Bluff), 6.1 miles southwest on Secondary Road 1175 to Joe, 4.1 miles west on Secondary Road 1181 to Little Creek Gap on the Haywood County line, 2.1 miles north on Secondary Road 1182 along the Tennessee State line to Max Patch trail head on the Appalachian Trail, approximately 1,000 feet northeast on the U.S. Forest Service road, 30 feet east of the road in woodland; Lemon Gap USGS topographic quadrangle; lat. 35 degrees 48 minutes 4.8 seconds N. and long. 82 degrees 57 minutes 27.8 seconds W.; NAD 27:

Oe—0 to 1 inch; moderately decomposed organic mat.
A1—1 to 6 inches; black (10YR 2/1) gravelly loam, very dark grayish brown (10YR 3/2) dry; weak fine granular structure; very friable; many very fine and fine, common medium, and few coarse roots; many very fine and fine tubular pores; few fine flakes of mica; 4 percent by volume gravel; very strongly acid; clear wavy boundary.
A2—6 to 9 inches; very dark grayish brown (10YR 3/2) gravelly loam, brown (10YR 5/3) dry; weak medium granular structure; very friable; many very fine and fine and common medium and coarse roots; few very fine and fine tubular pores; few fine flakes of mica; very strongly acid; 5 percent by volume gravel; clear smooth boundary.
Bw1—9 to 22 inches; brown (10YR 4/3) loam; weak fine subangular blocky structure;

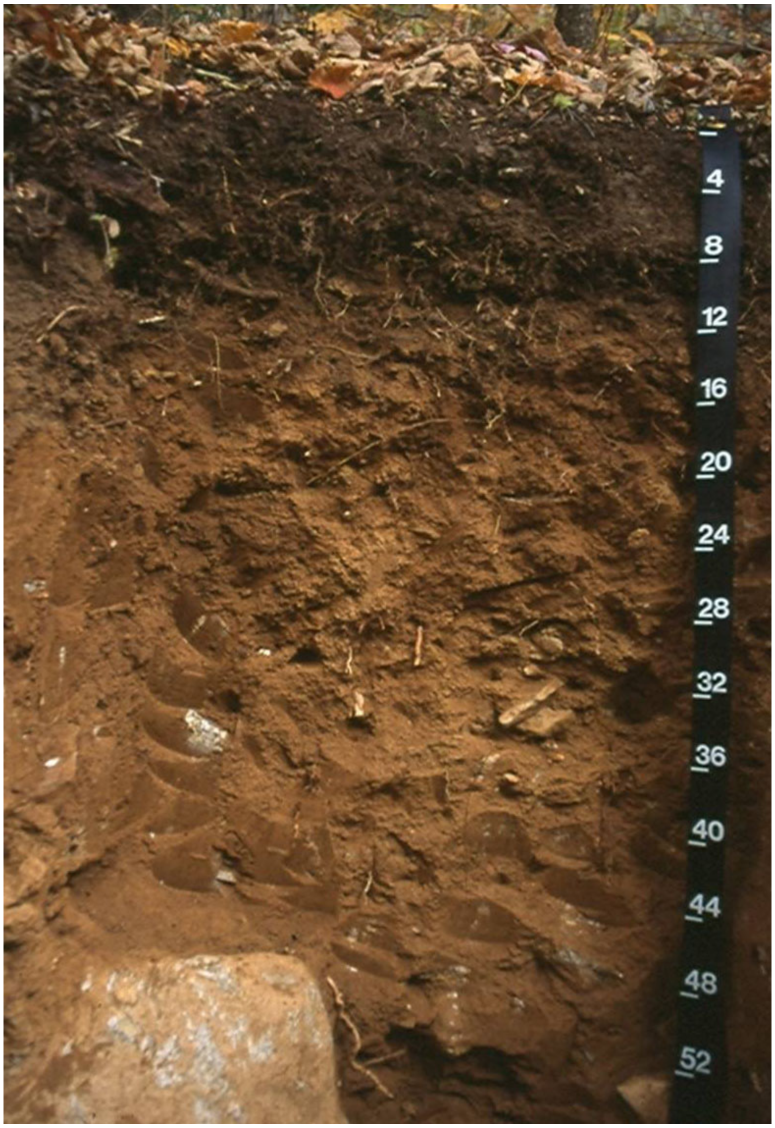

Figure 25.—Typical profile of Tusquitee gravelly loam. Tusquitee soils are very deep and formed from local colluvium. They occur in coves and drainageways on low or intermediate mountains, predominantly in the eastern and western parts of Madison County.

friable; common very fine, fine, and medium and few coarse roots; common very fine and fine tubular pores; few fine flakes of mica; 5 percent by volume gravel; strongly acid; gradual wavy boundary.

Bw2—22 to 37 inches; dark yellowish brown (10YR 4/6) gravelly sandy loam; weak medium subangular blocky structure; friable; common very fine and fine and few medium and coarse roots; common very fine and fine tubular pores; few fine flakes of mica; 12 percent by volume gravel and 6 percent cobbles; strongly acid; gradual wavy boundary.

Bw3—37 to 52 inches; yellowish brown (10YR 5/6) gravelly sandy loam; weak medium subangular blocky structure; friable; few very fine and common fine roots; few very fine and common fine tubular pores; few fine and medium flakes of mica; 15 percent by volume gravel and 10 percent cobbles; strongly acid; gradual wavy boundary.

BC—52 to 80 inches; dark yellowish brown (10YR 4/6) cobbly sandy loam; weak coarse subangular blocky structure; very friable; few fine and medium roots; few very fine and fine tubular pores; few fine and medium flakes of mica; 10 percent by volume gravel and 15 percent cobbles; strongly acid.

Range in Characteristics

Solum thickness: 40 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few or common in the A and B horizons and few to many in the C horizon
Rock fragments (content, size): Less than 35 percent by volume to a depth of 40 inches; less than 60 percent below a depth of 40 inches; ranging from gravel to stones
Soil reaction: Very strongly acid to slightly acid in the A horizon and very strongly acid to moderately acid in the Bw and lower horizons

A or Ap horizon:
Color—hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 to 4
Texture (fine-earth fraction)—loam, fine sandy loam, sandy loam, or sandy clay loam
Thickness of A horizon—7 to 10 inches

Bw horizon:
Color—hue of 5YR to 10YR, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, or sandy clay loam

BC horizon:
Color—hue of 5YR to 10YR, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, loam, or sandy clay loam

C horizon (if it occurs):
Color—hue of 5YR to 10YR, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—loamy coarse sand, loamy sand, loamy fine sand, coarse sandy loam, sandy loam, fine sandy loam, or loam colluvium

Udifluvents

Depth class: Very deep
Drainage class: Excessively drained
Depth to seasonal high water table: 3.5 to 5 feet from January through December
Permeability: Very rapid
Parent material: Recent alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountain valleys, dominantly along the French Broad River
Landform: Flood plains and river islands
Landform position: Planar to slightly convex slopes
Slope range: 0 to 5 percent

Typical Pedon

The map unit consists of very low-lying, riverwash areas subject to scouring and deposition during flooding. Areas include small islands and the inside river bends of the French Broad, Ivy, Laurel, and Shelton Laurel Rivers. A typical pedon is not given due to the variable nature of the soil.

Range in Characteristics

Depth to contrasting material: 40 to more than 60 inches to deposits of cobbles and gravel that are stratified with sandy or loamy material
Thickness of underlying soil material: More than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few to many
Rock fragments (content, size): 0 to 15 percent by volume to a depth of 40 inches and variable below a depth of 40 inches; content typically increasing with depth; dominantly gravel or cobbles but including stones and boulders
Soil reaction: Extremely acid to moderately acid throughout the profile

C horizon:
Color—horizon has hue of 7.5YR to 2.5Y, value of 3 to 7, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Redoximorphic features (if they occur)—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—coarse sand, sand, loamy coarse sand, loamy sand, or sandy loam alluvium

Udorthents

Depth class: Deep and very deep
Drainage class: Somewhat excessively drained to moderately well drained
Depth to seasonal high water table: Variable; occasionally 3 to 6 feet and more commonly more than 6 feet from January through December
Permeability: Very rapid to slow
Parent material: Fill areas—mixture of earthy material and natural soils; excavated areas—variable, depending on the type of underlying bedrock
Landscape: Intermountain hills and low and intermediate mountains
Landform: Summits, side slopes, coves, terraces, footslopes, toeslopes, and flood plains where the natural soil has been excavated or covered by earthy fill material
Slope range: 0 to 50 percent

Typical Pedon

The map unit consists of cut and fill areas where soil and the underlying material has been removed and placed on an adjacent site. Areas include highway right-of-way corridors and building sites. Other areas included in the map unit are landfills, borrow pits, and recreational areas such as ball fields and depressions filled with construction debris and covered with soil material. A typical pedon is not given due to the variable nature of the soil.

Range in Characteristics

Depth to bedrock: Excavated areas—bedrock commonly exposed at or near the soil surface; fill areas—40 to more than 60 inches
Rock fragments (content, size): Variable, commonly 15 to 50 percent; ranging from gravel to stones
Soil reaction: Extremely acid to moderately acid throughout the profile

Fill areas:
Color—hue of 2.5YR to 5Y, value of 4 to 8, and chroma of 2 to 8
Texture (fine-earth fraction)—variable; commonly loamy

Excavated areas:
Color—hue of 2.5YR to 5Y, value of 4 to 8, and chroma of 2 to 8
Texture (fine-earth fraction)—variable; commonly loamy

Unaka Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock such as granite and biotite gneiss
Landscape: Low and intermediate mountains, in the southwestern and eastern parts of the county
Landform: Ridges, north- to east-facing mountain slopes, and those slopes shaded by higher mountains
Landform position: Summits and side slopes
Slope range: 8 to 95 percent
Taxonomic classification: Fine-loamy, isotic, mesic Typic Dystrudepts

Typical Pedon

Unaka loam in an area of Porters-Unaka loam, 30 to 50 percent slopes, stony; in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 16.5 miles northeast on U.S. Highway 25 & 70 to Hot Springs, 8.2 miles south on North Carolina Highway 209 (just south of Bluff), 6.1 miles southwest on Secondary Road 1175 to Joe, 4.1 miles west on Secondary Road 1181 to Little Creek Gap on the Haywood County line, 5.8 miles northeast on Secondary Road 1182 to Lemon Gap on the Tennessee State line, 4.4 miles northeast from iron gate on U.S. Forest Service Road 3505, about 10 feet west of the road on a forested side slope; Lemon Gap USGS topographic quadrangle; lat. 35 degrees 50 minutes 13 seconds N. and long. 82 degrees 54 minutes 40 seconds W.; NAD 27:

Oe—0 to 1 inch; moderately decomposed organic mat.
A1—1 to 5 inches; very dark brown (10YR 2/2) loam, brown (10YR 4/3) dry; weak fine granular structure; very friable; many very fine, common fine and medium, and few coarse roots; common very fine and fine tubular pores; few very fine flakes of mica; 5 percent by volume gravel and 7 percent cobbles; very strongly acid; clear smooth boundary.
A2—5 to 9 inches; dark brown (10YR 3/3) loam, dark yellowish brown (10YR 4/4) dry; weak medium granular structure; very friable; many very fine, common fine and medium, and few coarse roots; common very fine and fine tubular pores; few very fine flakes of mica; 5 percent by volume gravel and 7 percent cobbles; strongly acid; clear smooth boundary.
Bw1—9 to 14 inches; dark yellowish brown (10YR 4/6) loam; moderate medium subangular blocky structure; friable; common very fine and fine and few medium and coarse roots; few fine tubular pores; few very fine and fine flakes of mica; 8 percent by volume gravel and 5 percent cobbles; very strongly acid; gradual wavy boundary.
Bw2—14 to 22 inches; yellowish brown (10YR 5/4) cobbly loam; weak medium subangular blocky structure; friable; common very fine and fine and few medium roots; few fine tubular pores; few very fine flakes of mica; 8 percent by volume gravel and 5 percent cobbles; very strongly acid; gradual wavy boundary.
BC—22 to 26 inches; yellowish brown (10YR 5/4) gravelly sandy loam; weak medium

subangular blocky structure; friable; few very fine, fine, and medium roots; few fine tubular pores; few very fine flakes of mica; 5 percent by volume gravel and 15 percent cobbles; very strongly acid; gradual wavy boundary.

Cr—26 to 32 inches; weathered, strongly cemented Max Patch granite with high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart; gradual wavy boundary.

R—32 to 80 inches; unweathered, hard Max Patch granite bedrock.

Range in Characteristics

Solum thickness: 18 to 36 inches
Depth to bedrock: 20 to 40 inches to hard bedrock
Content of mica flakes: Few or common
Rock fragments (content, size): 5 to 20 percent by volume in A and B horizons and 5 to 35 percent in C horizon; ranging from gravel to stones
Soil reaction: Very strongly acid or strongly acid throughout the profile

A horizon:
Color—hue of 10YR and value and chroma of 2 or 3
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy clay loam
Thickness—7 to 10 inches

Bw horizon:
Color—hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6
Texture (fine-earth fraction)—loam or sandy loam; some pedons have sandy clay loam

BC horizon:
Color—hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6
Texture (fine-earth fraction)—loam or sandy loam

C horizon (if it occurs):
Color—horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—sandy loam or loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, felsic or mafic high-grade metamorphic or igneous rock; moderate or high excavation difficulty
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:
Type of bedrock—unweathered, hard, felsic or mafic high-grade metamorphic or igneous rock; very high or extremely high excavation difficulty

Unicoi Series

Depth class: Shallow
Drainage class: Somewhat excessively drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock such as feldspathic metasandstone, quartzite, or arkosic sandstone
Landscape: Low and intermediate mountains in the northwestern and northern parts of the county
Landform: Ridges and south- to west-facing mountain slopes

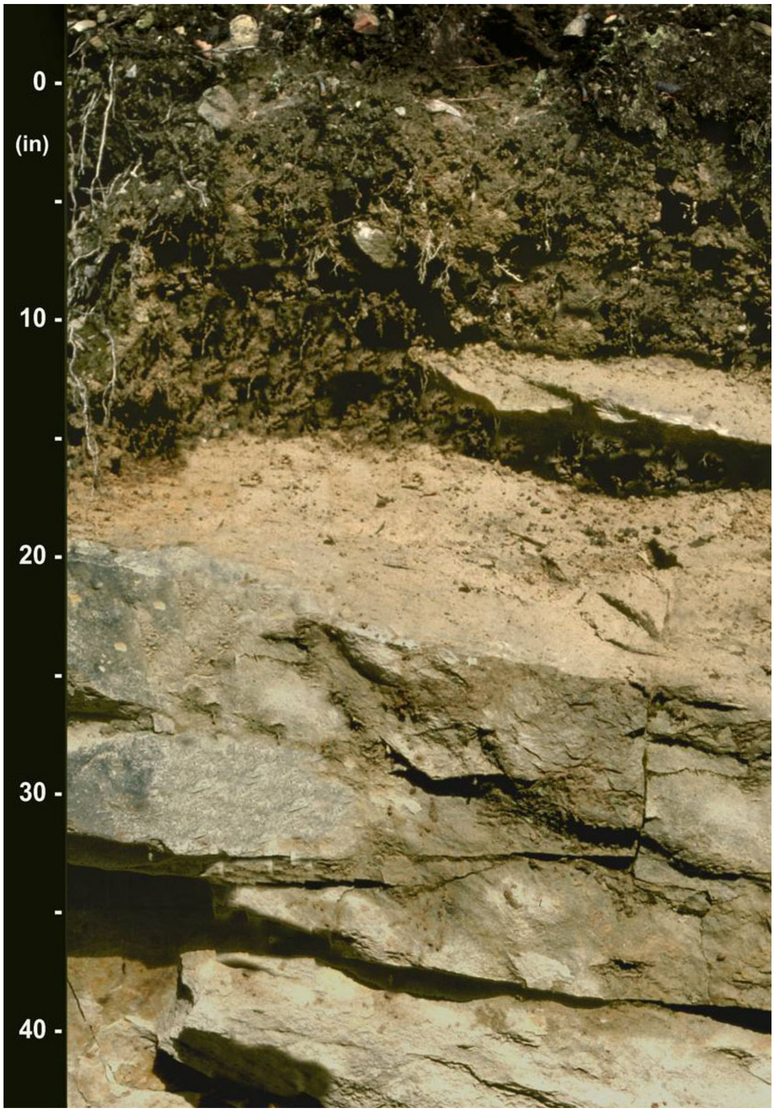

Figure 26.—Typical profile of Unicoi cobbly sandy loam. Unicoi soils are shallow to unweathered, hard bedrock. They occur on low or intermediate mountains predominantly in the northern half of Madison County.

Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Loamy-skeletal, mixed, semiactive, mesic Lithic Dystrudepts

Typical Pedon

Unicoi cobbly sandy loam in an area of Ditney-Unicoi complex, 50 to 95 percent slopes, very rocky (fig. 26); in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 16.5 miles northeast on U.S. Highway 25 & 70 to Hot Springs, 3.1 miles south on N.C. Highway 209 and 350 feet north of the Rocky Bluff campground entrance, 125 feet north of the road on a forested side slope; Spring Creek USGS topographic quadrangle; lat. 35 degrees 51 minutes 50 seconds N. and long. 82 degrees 50 minutes 51 seconds W.; NAD 27:

Oe—0 to 1 inch; moderately decomposed organic mat.

A—1 to 4 inches; dark grayish brown (10YR 4/2) cobbly sandy loam, light yellowish brown (10YR 6/4) dry; weak medium granular structure; very friable; many very fine and fine and few medium and coarse roots; common very fine to coarse tubular pores; 5 percent by volume gravel, 15 percent cobbles, and 5 percent stones; very strongly acid; clear smooth boundary.

BA—4 to 8 inches; dark yellowish brown (10YR 4/4) very cobbly sandy loam; weak fine subangular blocky structure; very friable; common very fine and fine and few medium and coarse roots; few very fine to coarse tubular pores; 15 percent by volume gravel, 20 percent cobbles, and 5 percent stones; very strongly acid; gradual smooth boundary.

Bw—8 to 14 inches; yellowish brown (10YR 5/6) cobbly sandy loam; weak medium subangular blocky structure; friable; few fine and medium roots; few fine and medium pores; 10 percent by volume gravel, 25 percent cobbles, and 10 percent stones; very strongly acid; gradual irregular boundary.

BC—14 to 18 inches; yellowish brown (10YR 5/6) very cobbly sandy loam; weak fine subangular blocky structure; very friable; few fine and medium roots; few fine and medium pores; 10 percent by volume gravel, 25 percent cobbles, and 15 percent stones; very strongly acid; gradual wavy boundary.

R—18 to 80 inches; unweathered, hard interbedded arkosic metasandstone bedrock.

Range in Characteristics

Solum thickness: 7 to 20 inches
Depth to bedrock: 7 to 20 inches to hard bedrock
Content of mica flakes: None or few
Rock fragments (content, size): 15 to 60 percent by volume in the A horizon and 35 to 60 percent in the B and C horizons; ranging from gravel to stones
Soil reaction: Extremely acid to strongly acid throughout the profile

A horizon:
Color—hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 1 to 4; where value is 3 or less, the horizon is less than 7 inches thick
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

BA or AB horizon (if it occurs):
Color—hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 or 4; where value is 3 or less, the horizon is less than 7 inches thick
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

Bw horizon:
Color—horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8 or is mottled in shades of yellow or brown
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

BC horizon:
Color—horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8 or is mottled in shades of yellow or brown
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam
Thickness—3 to 6 inches

C horizon (if it occurs):
Color—horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8 or is mottled in shades of yellow or brown
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam saprolite

R layer:
Type of bedrock—unweathered, hard, low-grade metasedimentary rock; very high or extremely high excavation difficulty

Unison Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate
Parent material: Old alluvium and colluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountain valleys of low mountains, dominantly along the Shelton Laurel and Spring Creeks, in the intermountain hills and low mountains, in the northwestern and southeastern parts of the county
Landform: Coves and high stream terraces
Landform position: Footslopes, toeslopes, and benches
Slope range: 2 to 30 percent
Taxonomic classification: Fine, mixed, semiactive, mesic Typic Hapludults

Typical Pedon

Unison loam, 8 to 15 percent slopes; in Madison County, North Carolina; from Marshall, 1.0 mile southeast on U.S. Highways 25 & 70 Business, 1.3 miles northeast on Secondary Road 1198, about 8.3 miles northeast on North Carolina Highway 213 just east of Mars Hill, 1.8 miles southeast on Interstate 26 and U.S. Highway 19 & 23 to Exit 15 in Buncombe County, 1.35 miles southwest on Secondary Road 1768, about 0.5 mile northwest to the end of Secondary Road 1769, about 0.3 mile northeast on a private road, about 250 feet northwest of the road and 300 feet southeast of the Ivy River, in a cultivated field; Mars Hill USGS topographic quadrangle; lat. 35 degrees 47 minutes 14 seconds N. and long. 82 degrees 33 minutes 16 seconds W.; NAD 27:

Ap1—0 to 6 inches; dark yellowish brown (10YR 4/4) loam, light yellowish brown (10YR 6/4) dry; moderate fine granular structure; very friable; many very fine and fine and common medium roots; many medium tubular pores; few very fine flakes of mica; 3 percent by volume subangular quartz gravel; neutral; clear smooth boundary.

Ap2—6 to 10 inches; dark yellowish brown (10YR 4/6) loam, brownish yellowish (10YR 6/6) dry; weak fine granular structure; very friable; many very fine and fine and common medium roots; common fine and many medium tubular pores; few very fine flakes of mica; 3 percent by volume subangular quartz gravel; neutral; clear smooth boundary.

BA—10 to 16 inches; strong brown (7.5YR 4/6) clay loam; moderate medium granular structure; friable; slightly sticky, slightly plastic; common very fine and fine roots; common fine and medium tubular pores; few discontinuous distinct strong brown (7.5YR 5/6) clay films on faces of peds; few very fine flakes of mica; 3 percent by volume subangular quartz gravel; neutral; gradual wavy boundary.

Bt1—16 to 38 inches; strong brown (7.5YR 5/6) clay; moderate medium subangular blocky structure; firm; sticky, plastic; common very fine and fine roots; common fine and medium tubular pores; few discontinuous distinct strong brown (7.5YR 4/6) clay films on faces of peds; few very fine flakes of mica; 3 percent by volume subangular quartz gravel; slightly acid; gradual wavy boundary.

Bt2—38 to 49 inches; strong brown (7.5YR 5/8) clay; moderate medium subangular blocky structure; firm; sticky, plastic; few very fine and fine roots; common fine and few coarse tubular pores; few discontinuous faint strong brown (7.5YR 5/6) clay films on faces of peds; few very fine to medium black (10YR 2/1) iron-manganese staining; few fine flakes of mica; 10 percent by volume subangular quartz gravel and cobbles; moderately acid; gradual wavy boundary.

BC—49 to 80 inches; strong brown (7.5YR 5/8) gravelly clay loam; common fine distinct yellowish brown (10YR 5/6) and common medium distinct reddish brown

(5YR 4/4) mottles; weak medium subangular blocky structure; friable; few very fine roots; common fine and few medium tubular pores; few patchy faint strong brown (7.5YR 4/6) clay films on faces of peds; few very fine to medium black (10YR 2/1) iron-manganese staining; common fine and medium flakes of mica; 12 percent by volume subangular quartz gravel and 5 percent cobbles; moderately acid.

Range in Characteristics

Solum thickness: 30 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few to many
Rock fragments (content, size): Less than 35 percent by volume in the Ap, A, BA, or Bt horizons and less than 70 percent in the underlying horizons; dominantly gravel and cobbles
Soil reaction: Very strongly acid to moderately acid throughout the profile, except where surface layers have been limed

Ap horizon:
Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 to 6; where value is 3 or less, the horizon is less than 7 inches thick
Texture (fine-earth fraction)—loam or fine sandy loam

BA horizon:
Color—hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6
Texture (fine-earth fraction)—clay loam, silty clay loam, or heavy silt loam

Bt horizon:
Color—hue of 5YR to 10YR, value of 4 or 5, and chroma of 3 to 8
Texture (fine-earth fraction)—clay or clay loam

BC horizon:
Color—hue of 2.5YR to 7.5YR, value of 3 to 8, and chroma of 3 to 6
Texture (fine-earth fraction)—clay loam, loam, or clay

C or 2C horizon (if it occurs):
Color—hue of 2.5YR to 7.5YR, value of 4 to 8, and chroma of 3 to 6
Texture (fine-earth fraction)—loam or clay loam colluvium/alluvium; sandy, gravelly, and cobbly substrata occur in some pedons

Walnut Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic, high-grade metamorphic or igneous rock such as migmatitic gneiss
Landscape: Low and intermediate mountains, dominantly in the southeastern and south-central parts of the county
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Slope range: 8 to 95 percent
Taxonomic classification: Coarse-loamy, mixed, superactive Dystric Eutrudepts

Typical Pedon

Walnut fine sandy loam in an area of Walnut-Oteen-Mars Hill complex, 30 to 50 percent slopes, moderately eroded; in Madison County, North Carolina; from Marshall, 4.3 miles south on Secondary Road 1001, about 1.2 mile southwest on Secondary Road 1114, about 0.5 mile northeast on Secondary Road 1116, about 0.3 mile east on Secondary Road 1115, about 0.3 mile northeast on an unmarked farm road to a gate, 250 feet northeast on a west-facing convex slope of 45 percent, in a pasture; USGS Leicester topographic quadrangle; lat. 35 degrees 44 minutes 15 seconds N. and long. 82 degrees 40 minutes 44 seconds W.; NAD 27:

Ap1—0 to 2 inches; brown (10YR 4/3) fine sandy loam, yellowish brown (10YR 5/4) dry; moderate fine granular structure; very friable; common very fine roots; few fine and medium interstitial pores; few fine flakes of mica; 5 percent by volume migmatitic gneiss gravel; strongly acid; abrupt smooth boundary.

Ap2—2 to 9 inches; dark yellowish brown (10YR 4/4) fine sandy loam; common medium distinct strong brown (7.5YR 4/6) mottles in interior of peds; weak coarse granular structure; very friable; few very fine roots; few fine and medium interstitial and few very fine and fine tubular pores; few fine flakes of mica; 4 percent by volume migmatitic gneiss gravel; moderately acid; abrupt smooth boundary.

Bw—9 to 21 inches; strong brown (7.5YR 4/6) loam; weak fine subangular blocky structure; very friable; few very fine roots; few fine and medium interstitial and few very fine and fine tubular pores; common fine flakes of mica; 1 percent by volume migmatitic gneiss gravel; slightly acid; gradual wavy boundary.

BC—21 to 27 inches; strong brown (7.5YR 4/6) very gravelly fine sandy loam; weak fine subangular blocky structure; very friable; few very fine roots; few fine and medium interstitial and few very fine and tubular pores; common fine flakes of mica; 28 percent by volume migmatitic gneiss gravel; slightly acid; gradual irregular boundary.

Cr—27 to 42 inches; weathered, strongly cemented migmatitic gneiss with high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart; gradual wavy boundary.

R—42 to 80 inches; unweathered, hard migmatitic gneiss bedrock.

Range in Characteristics

Solum thickness: 15 to 39 inches
Depth to bedrock: 20 to 40 inches to weathered bedrock
Content of mica flakes: Few or common
Rock fragments (content, size): 0 to 35 percent in the A and B horizons and 0 to 40 percent in the C horizon
Soil reaction: Strongly acid to neutral throughout the profile

A or Ap horizon:
Color—hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 6; where value is 3 or less, the horizon is less than 7 inches thick
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

Bw horizon:
Color—hue of 7.5YR to 2.5Y and value and chroma of 4 to 6
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam

BC horizon:
Color—hue of 7.5YR to 2.5Y and value and chroma of 4 to 6
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

C horizon (if it occurs):
Color—horizon has hue of 7.5YR to 5Y and value and chroma of 4 to 6 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam saprolite

Cr layer:

Type of bedrock—weathered, weakly to strongly cemented, mixed felsic and mafic, high-grade metamorphic rock such as migmatitic gneiss, biotite-hornblende gneiss, and amphibolite; moderate or high excavation difficulty

Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:

Type of bedrock—unweathered, hard, mixed felsic and mafic, high-grade metamorphic rock such as migmatitic gneiss, biotite-hornblende gneiss, and amphibolite

Wayah Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from granite
Landscape: High mountains on Max Patch Mountain
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Slope range: 8 to 95 percent
Taxonomic classification: Fine-loamy, isotic, frigid Humic Dystrudepts

Typical Pedon

Wayah loam in an area of Wayah-Burton complex, windswept, 30 to 50 percent slopes, bouldery; in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 16.5 miles northeast on U.S. Highway 25 & 70 to Hot Springs, 8.2 miles south on North Carolina Highway 209 (just south of Bluff), 6.1 miles southwest on Secondary Road 1175 to Joe, 4.1 miles west on Secondary Road 1181 to Little Creek Gap on the Haywood County line, 1.6 miles north on Secondary Road 1182 along the Tennessee State line to Max Patch trail head on the Appalachian Trail, approximately 0.3 mile northeast of a U.S. Forest Service parking lot, in a grassy bald; Lemon Gap USGS topographic quadrangle; lat. 35 degrees 47 minutes 49.7 seconds N. and long. 82 degrees 57 minutes 29.1 seconds W.; NAD 27:

Oe—0 to 1 inch; moderately decomposed organic mat.

A1—1 to 6 inches; very dark brown (10YR 2/2) loam, brown (10YR 4/3) dry; moderate medium granular structure; very friable; many very fine, fine, medium, and coarse roots throughout; many very fine and fine tubular and interstitial pores; few very fine and fine flakes of mica; 3 percent by volume gravel and cobbles; extremely acid; abrupt smooth boundary.

A2—6 to 13 inches; very dark grayish brown (10YR 3/2) loam, brown (10YR 5/3) dry; weak fine and medium granular structure; very friable; common very fine, fine, and medium and few coarse roots throughout; common very fine and fine tubular and interstitial pores; few very fine and fine flakes of mica; 3 percent by volume gravel and cobbles; very strongly acid; abrupt smooth boundary.

Bw1—13 to 32 inches; yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; friable; few fine to coarse roots between peds; common very fine and fine tubular and interstitial pores; few very fine and fine flakes of mica; 6 percent by volume gravel and cobbles; strongly acid; gradual wavy boundary.

Bw2—32 to 47 inches; yellowish brown (10YR 5/4) sandy loam; weak medium to coarse subangular blocky structure; friable; few fine and medium roots between peds; common very fine and fine tubular pores; few very fine and fine flakes of mica; 7 percent by volume gravel and 5 percent cobbles; strongly acid; gradual wavy boundary.

C—47 to 80 inches; pale brown (10YR 6/3) sandy loam saprolite; common fine faint brown (10YR 5/3) mottles; massive; very friable; few very fine tubular pores; few very fine and fine flakes of mica; 7 percent by volume gravel and 5 percent cobbles; moderately acid.

Range in Characteristics

Solum thickness: 20 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few or common in the upper 40 inches and few to many below a depth of 40 inches
Rock fragments (content, size): Less than 35 percent by volume; ranging from gravel to stones
Soil reaction: Extremely acid to moderately acid throughout the profile

A horizon:
Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—sandy loam, fine sandy loam, loam, sandy clay loam, or clay loam
Thickness—10 to 20 inches

BA horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 3 or 4
Mottles (if they occur)—in shades of brown
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, or sandy clay loam

Bw horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Mottles (if they occur)—in shades of brown
Texture (fine-earth fraction)—sandy loam, fine sandy loam, loam, or sandy clay loam

BC horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—sandy loam, coarse sandy loam, fine sandy loam, or loam

C horizon:
Color—horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—sandy loam, loamy sand, loamy fine sand, fine sandy loam, or loam saprolite

Cr layer (if it occurs):
Type of bedrock—weathered, weakly to strongly cemented felsic igneous rock (Max Patch granite); moderate or high excavation difficulty
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Whiteside Series

Depth class: Very deep
Drainage class: Moderately well drained

Depth to seasonal high water table: 2.0 to 3.0 feet from December through May and 2.0 to 3.5 feet from June through November
Permeability: Moderate
Parent material: Colluvium and old alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountain valleys of the intermountain hills and low mountains throughout the county
Landform: Coves, colluvial fans, and benches
Landform position: Concave to planar toeslopes
Slope range: 2 to 15 percent
Taxonomic classification: Fine-loamy, mixed, active, mesic Aquic Hapludults

Typical Pedon

Whiteside loam in an area of Tusquitee-Whiteside complex, 2 to 8 percent slopes; in Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 16.5 miles northeast on U.S. Highway 25 & 70 to Hot Springs, 11.3 miles south on N.C. Highway 209, about 0.5 mile northeast on a farm road and 200 feet north in a hayfield; Spring Creek USGS topographic quadrangle; lat. 35 degrees 47 minutes 56.1 seconds N. and long. 82 degrees 52 minutes 7.7 seconds W.; NAD 27:

Ap—0 to 11 inches; dark brown (10YR 3/3) loam, dark yellowish brown (10YR 4/4) dry; weak medium granular structure; very friable; common fine and medium roots throughout; common fine and medium tubular pores; 8 percent by volume subangular gravel; common fine flakes of mica; slightly acid; abrupt smooth boundary.

Bt1—11 to 23 inches; yellowish brown (10YR 5/6) sandy clay loam; common very dark grayish brown (10YR 3/2) streaks in old root channels; weak medium subangular blocky structure; very friable; few fine roots between peds; few fine tubular pores; common fine flakes of mica; slightly acid; clear wavy boundary.

Bt2—23 to 31 inches; yellowish brown (10YR 5/4) sandy clay loam; common medium distinct very pale brown (10YR 7/3) mottles; weak medium subangular blocky structure; friable; few fine roots between peds; few fine tubular pores; many medium prominent strong brown (7.5YR 4/6) and grayish brown (10YR 5/2) irregularly shaped masses of iron accumulation with clear boundaries in the matrix; few faint clay films on faces of peds; common fine flakes of mica; moderately acid; clear wavy boundary.

BCg—31 to 45 inches; gray (10YR 6/1) sandy loam; weak medium subangular blocky structure; friable; few fine roots between peds; few fine tubular pores; common medium faint gray (10YR 5/1) irregularly shaped iron depletions with clear boundaries and common medium distinct yellowish brown (10YR 5/8) irregularly shaped iron depletions along root channels with clear boundaries throughout; common fine to coarse flakes of mica; moderately acid; gradual wavy boundary.

Cg1—45 to 55 inches; light brownish gray (10YR 6/2) sandy loam; common medium distinct brownish yellow (10YR 6/6) mottles; massive; very friable; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Cg2—55 to 80 inches; gray (10YR 6/1) sandy clay loam; common medium distinct yellowish brown (10YR 4/6) mottles; common thin lenses and pockets of grayish brown (10YR 5/2) loamy sand; massive; firm; few fine flakes of mica; strongly acid.

Range in Characteristics

Solum thickness: 30 to 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few to many
Rock fragments (content, size): Less than 15 percent by volume; some pedons, below

a depth of 40 inches, have 15 to less than 60 percent; ranging from gravel to stones

Soil reaction: Very strongly acid to moderately acid, except where surface layers have been limed

A or Ap horizon:

Color—hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam
Thickness of A horizon—10 to 20 inches

Bt horizon:

Color—hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 3 to 8; chroma of 2 or less within a depth of 24 inches of the upper part of Bt horizon
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—sandy clay loam, loam, fine sandy loam, or sandy loam

BC horizon (if it occurs):

Color—hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 3 to 8
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam

BCg horizon:

Color—hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 to 2
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—fine sandy loam, loam, or sandy loam

C horizon (if it occurs):

Color—hue of 10YR to 5Y, value of 4 to 7, and chroma of 3 to 8
Mottles—shades of red, yellow, brown, olive, or gray
Texture (fine-earth fraction)—fine sandy loam, loamy sand, loam, or sandy clay loam colluvium/alluvium; sandy strata occur in some pedons below a depth of 40 inches

Cg horizon:

Color—hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray; iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—sandy loam or sandy clay loam; fine sandy loam or loam colluvium/alluvium; sandy strata occur below a depth of 40 inches in some pedons

Formation of the Soils

This section describes the factors of soil formation and relates them to the soils in the survey area. It also discusses the processes of horizon differentiation and the geology of Madison County.

Factors of Soil Formation

A soil is a three-dimensional natural body consisting of mineral and organic material that can support life. The nature of any soil at a given site is a result of the interaction of five general factors—parent material, climate, plants and animals, relief, and time. Climate and plants and animals have an effect on parent material that is modified by relief over time. Theoretically, if all the soil-forming factors were identical at different sites, the soils at these sites would be identical. Differences among soils are caused by variations in one or more of these factors.

Parent Material

Parent material is the unconsolidated mass in which soil forms. It is derived from the physical and chemical breakdown of rocks. The physical and chemical composition of parent material has an important effect on the kind of soil that forms. Parent material influences the amount of sand, silt, and clay in a soil as well as acidity, color, erodibility, and other soil characteristics that affect use and management. For example, the amount of clay in a soil is directly related to the minerals that occur in the parent material. The amount of clay affects such factors as workability, fertilizer and water retention, and the performance of septic tank filter fields.

There are three categories of parent material in Madison County: residuum, colluvium, and alluvium (fig. 27).

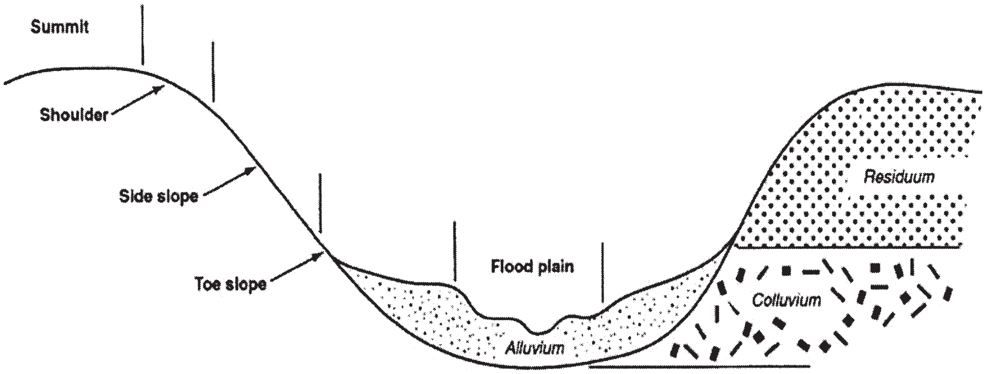

Figure 27.—Relationship of landform positions and parent material.

Residuum

Residuum occurs throughout the county on ridgetops and side slopes of intermountain hills and low, intermediate, and high mountains. Residual parent material is the result of bedrock weathering in place. In Madison County, residuum is derived from four general rock types: low-grade metasedimentary, felsic high-grade metamorphic, mafic high-grade metamorphic, and sedimentary.

Low-grade metasedimentary rocks such as phyllite, metasandstone, quartzite, and metagraywacke are the parent material for Ditney, Unicoi, Soco, Junaluska, Sylco, and Chestoa soils. These soils are brown, yellow, or red, have bedrock dominantly within a depth of 60 inches, and are low in natural fertility. They occur in the northern part of the county.

Felsic high-grade metamorphic rocks such as granite, gneiss, and schist weather into the parent material for Wayah, Burton, Porters, Chestnut, Buladean, Cleveland, and Ashe soils. These soils vary in depth and color due to the degree of resistance to weathering exhibited by the parent material and to the variation in mineral composition. They occur in the southwest part of the county, in the Big Pine, Spring Creek, and Meadow Fork communities, and in the east, in the Big Laurel and Paint Fork communities.

Mafic high-grade metamorphic rocks such as amphibolite and metagabbro yield parent material that is rich in clay-forming minerals. Clifton soils are the dominant soils formed from this residuum. They are red and very deep and have relatively higher natural fertility. Evard and Cowee soils at the upper limit of their clay content range also occur in areas of these rocks. Other mafic rocks such as migmatitic biotite-hornblende and biotite-hornblende gneiss are the parent material for Walnut, Mars Hill, and Oteen soils. These soils vary in depth, color, and clay content due to the degree of resistance to weathering exhibited by the parent material and to the variation in mineral composition. They occur throughout the southern part of the county and are dominant in the Mars Hill, Marshall, and Little Sandymush communities.

Sedimentary rocks such as shale, siltstone, and dolomite yield parent material that is higher in silt-forming minerals. Calvin soils are the dominant soils formed from this residuum. These soils are red or yellow, have bedrock at a depth of 20 to 40 inches, and are low in natural fertility. They occur in the Lower Shut-in Creek and Shaleville areas, west of Hot Springs, in the northwestern part of the county.

Colluvium

Colluvium is distributed throughout Madison County in coves, on benches, on footslopes, on toeslopes, and in sloping drainageways. Colluvial soils formed in parent material that has slid or fallen downslope under the influence of gravity. They are loamy and very deep and contain angular to subrounded rock fragments that increase in quantity as depth increases. Surface stones and boulders are common. Soils that formed in colluvium are Tate, Toecane, Tusquitee, Whiteside, Northcove, Maymead, Keener, Heintooga, and Chiltoskie. Dillard, Statler, and Hemphill soils are unique in that they formed in colluvium on toeslopes and old alluvium on low terraces. Unison and Braddock soils formed in old alluvium on high terraces. Unison soils also formed in colluvium in coves.

Alluvium

Alluvium is parent material deposited on flood plains along streams and rivers. Alluvial soils have very little development because the soil-forming processes are interrupted by each flooding event. The texture of the alluvial material varies, depending on the speed of the floodwater, the duration of flooding, and the distance from the streambank. Alluvial soils are usually stratified with increasing quantities of rounded rock fragments.

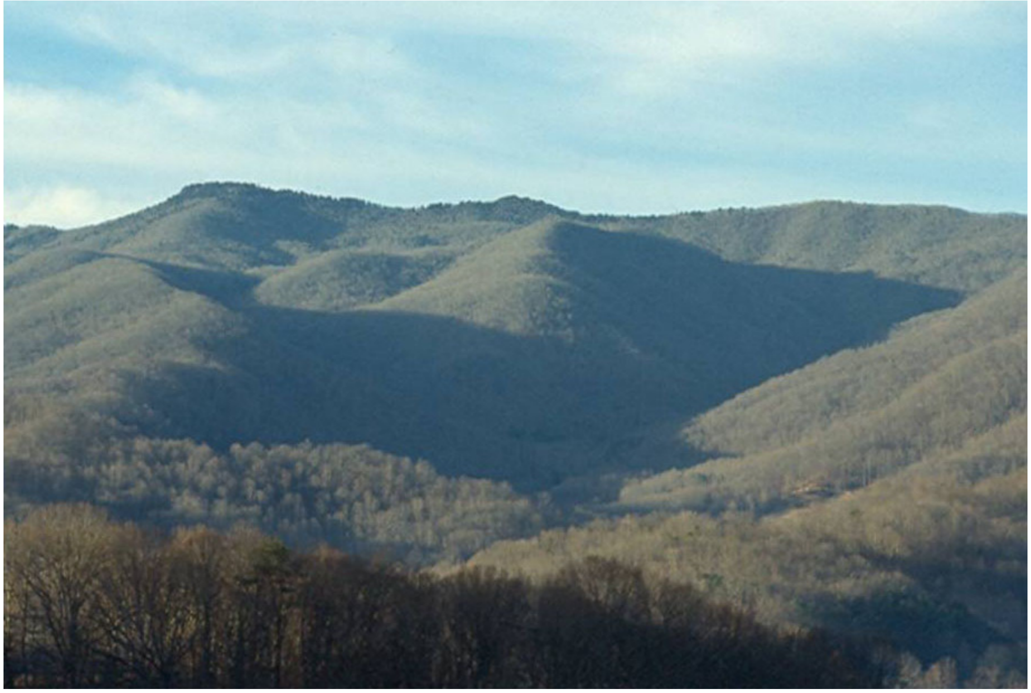

Figure 28.—Aspect, elevation, and relief influence soil formation. Microclimates on cool and shaded slopes have higher moisture and organic matter contents and lower soil temperatures.

In general, soils closest to the headwaters show the least soil development and are shallower to strata with a high content of rock fragments. Dellwood, Reddies, and Ela soils formed in these areas. Flood plains farther downstream receive finer parent material that has undergone more mechanical weathering, and the soils in these areas show slightly more development. French, Rosman, and Ela soils are examples. Adjacent to the largest streams and the French Broad River where flooding is frequent and velocity is high, sandy Biltmore soils formed.

Climate

Climate affects the chemical, biological, and physical relationships in the soil primarily through the influences of precipitation and temperature. Annual rainfall varies considerably across the county. It ranges from 35 to 40 inches in the Marshall area in the southern part of the county to more than 58 inches on Max Patch Mountain in the northwestern part of the county. Rainwater, a weak acid, chemically dissolves rocks, minerals, and organic matter, releasing the nutrients needed for life in the soil. Water transports organic matter, soil particles, and nutrients through the soil. The effects of climate also control the biological relationships among plants and other soil life. Temperature influences the kind and growth of organisms and the speed of physical and chemical reactions in the soil. The freeze-thaw cycle also affects the formation of soils by assisting in the breakdown of rock into parent material.

Localized microclimates, the result of unique combinations of climate, aspect, landscape position, and elevation, are important to the soil-forming process (fig. 28). For example, the high rainfall and cool temperatures of high mountains produce brown, medium textured soils that have a high content of organic matter in the surface layer. The warmer temperatures and the lower rainfall of the low mountains produce red soils that have less organic matter in the surface layer and more clay in the subsoil. Both areas host distinctly different plant and animal communities, indicating that unique environmental factors are at work.

Plant and Animal Life

Plant and animal life influences the formation of soil and differentiation of soil horizons. The kind and number of organisms that exist in and on the soil are determined to a large extent by climate and by parent material, relief, and the age of the soil. Bacteria, fungi, and other microscopic organisms aid in the weathering of rock, the decomposition of organic matter, and the mixing of the surface layers. The larger plants and animals furnish organic matter and transfer elements from the subsoil to the surface layer. Soil properties affected include color, structure, reaction, and the content and distribution of organic matter.

Trees and plants take up nutrients from deeper parts of the soil and add them to the surface as leaves, twigs, and roots. This organic matter is chemically and physically altered by micro-organisms, earthworms, and higher forms of life. The nutrients are mineralized and leach into the root zone. Other plants take up these nutrients, continuing the cycle. This process is called biocycling. Where deep-rooted plants are removed, the accumulated nutrients are lost from the system.

Human activity has significantly influenced soil formation. Native forests have been cleared for farming and other uses. Cultivation has accelerated erosion on sloping soils; wet soils have been drained; and manure, lime, chemical fertilizer, and pesticides have been applied across the landscape. Cultivation has affected soil structure and lowered organic matter content. The development of land for urban uses or for mining has significantly influenced the soil in some areas.

Relief

The relief or topography in Madison County is a result of mountain building, slope retreat, and the dissection of the land surfaces by major streams and their tributaries. Slope retreat and dissection of the land surface are controlled by the hardness of the bedrock and the amount of uplift in the area. Relief, in turn, influences soil formation by creating differences in internal drainage, surface runoff, geologic erosion, soil temperature, and plant cover. Mountains also influence weather patterns and thus local climate.

Internal drainage of the soil is affected by landscape position. Soils on ridgetops and side slopes are well drained while soils at the base of slopes and in coves can be affected by seeps and springs. On flood plains, soils next to the streams are commonly well drained while soils farther back can have a high water table.

Surface runoff and geologic erosion increase as slope increases. This reduces the amount of water that percolates through the soil. Thus, soils on steep side slopes are less developed. Soil creep also influences soil formation on mountainous terrain. Generally, the upper part of most soils on side slopes formed in material that is very slowly moving down slope. The extent of soil creep is controlled by time, steepness of slope, and slope length. Soils that formed on ridgetops and shoulder slopes are much less affected by soil creep and may be the only completely residual soils. Generally, soil depth increases down slope. Maximum soil thickness occurs in concave areas, in coves, on footslopes, and on toeslopes.

Relief influences soil temperature, moisture, and organic matter content through aspect and elevation. For example, south- to west facing slopes receive direct sunlight and warm up earlier in the spring. Soils on north- to east-facing slopes and those shaded by higher mountains are cooler, retain moisture, and thus have higher organic matter content in the surface layer. Conditions are similar at elevations above 4,000 feet which are cooler and receive more rainfall. Together these conditions affect soil formation by regulating plant and animal activity and the weathering process.

Time

The amount of time parent material has been exposed to the soil-forming processes accounts for some of the differences between soils. The horizons in a soil profile also take a long time to develop. This development proceeds at a rate dependent upon climate, relief, parent material, and the activity of plants and animals. Soil formation is a function of geologic time although flooding, erosion, and landslides affect soils in a human time frame.

The soils of Madison County vary considerably in age. The oldest soils occur on warm, stable uplands. Clifton, Fannin, and Evard soils are examples. Older soils generally have had more time for clay to form, move, and accumulate. Their horizons are more defined than those of young soils.

Most soils in the county are relatively young and less developed. On uplands, some of these soils are Buladean, Chestnut, Porters, Ditney, Soco, and Stecoah. One reason these soils have not had time to develop further is the steepness of slope. Geologic erosion and the percolation of water down slope instead of through the soil work against soil formation. The high elevation soils such as Wayah, Burton, and Oconaluftee are young partially due to climatic factors that have not allowed enough time for favorable temperatures to drive soil development.

In coves, Toecane, Northcove, Maymead, Heintooga, and Chiltoskie soils are examples of young soils. These soils are on more active landscapes where they receive material from geologic erosion. In addition, water moves through these soils as seeps and springs, carrying clay particles out of the soil. Heintooga and Chiltoskie soils are further slowed in their development by the cold climate in which they occur.

The youngest soils formed in alluvium, on flood plains. This landscape is also less stable, or more active, as flooding adds to or takes away soil material. Examples of the youngest soils are Dellwood, Reddies, Biltmore, and French.

Processes of Horizon Differentiation

One or more soil-forming processes are involved in the formation of soil horizons. These processes are the accumulation of organic matter; the leaching of bases and other soluble material; the chemical weathering, mainly by hydrolysis, of primary minerals into silicate clay minerals; the translocation of silicate clay and some silt-sized particles from one horizon to another; and the reduction and transfer of iron. These processes are also referred to as additions, removals, transfers, and transformations.

Some organic matter has accumulated in all of the soils in the survey area. Most of the soils contain moderate amounts of organic matter in the surface layer. The content of organic matter ranges from low, as in Clifton soils, to very high, as in Wayah soils.

Most of the soils in the survey area are acid in the upper layers, unless the surface layer has been limed. The leaching of bases occurs with the percolating of water down through the soil profile. The relatively high amount of rainfall over geologic time has created acid conditions in the soils of Madison County. Walnut, Mars Hill, and Oteen soils that formed over mafic rocks in the Mars Hill, Marshall, and Little Sandymush communities are exceptions.

The translocation of clay minerals is an important process in the development of many soils in the survey area. As clay minerals are removed from the A horizon, they accumulate as clay films on the faces of peds, in pores, and in root channels in the B horizon. The amount of translocated clay is low in Buladean and Stecoah soils and high in Evard and Clifton soils.

As silicate clay forms from primary minerals, some iron is commonly released as hydrated oxides. These oxides are generally red. Even if they occur in small amounts, they give the soil material a brownish color. They are largely responsible for the strong brown, yellowish brown, reddish brown, or red colors that are dominant in the subsoil of soils in the survey area.

The reduction and transfer of iron has occurred in all of the soils that are not characterized by good natural drainage. This process, known as gleying, is evidenced by a gray matrix color and by iron or clay depletions. Some of the iron may be reoxidized and segregated and thus form yellow, brown, red, or other brightly colored masses of iron accumulation in an essentially gray matrix in the subsoil. Nodules or concretions of iron or manganese also commonly form as a result of this process. Soil features associated with chemically reduced iron are referred to as redoximorphic features *(23)*. Somewhat poorly drained French soils and poorly drained Hemphill soils display many of these features.

Geology and Soils of Madison County

Carl E. Merschat and Bart L. Cattanach, Area Geologists, North Carolina Geological Survey, North Carolina Department of Environment and Natural Resources, prepared this section.

Physiography

The mountainous area of western North Carolina is part of the Appalachian Mountain system that extends from Alabama to easternmost Canada. The Appalachians are complex with numerous different sections, each characterized by very distinct geologically controlled topographic features. These sections are called physiographic provinces. Madison County is located in the southern Blue Ridge Physiographic Province, which is further separated into four subdivisions *(8)*. Most of the county is in the Blue Ridge Highlands subdivision. A small portion that adjoins Tennessee is in the Chilhowee-Walden Creek subdivision. The Blue Ridge Highlands subdivision is characterized by a complex, irregular pattern of mountain ranges, intermontane basins, and trench valleys.

Although mountainous terrain dominates the landscape of Madison County, parts of the county lie in low areas such as the Asheville basin, the Hot Springs basin, and the Laurel Creek trench valley. Rock type controls the topography, but not as strikingly as in other parts of western North Carolina. Areas underlain by massive granites and resistant, quartz-rich, sedimentary rocks form the higher mountains and ranges. The intermontane basins and trench valleys typically develop on less-resistant rock types; although, in some cases, they are the result of tectonic influences. In the basins and trench valleys, weathering develops to its greatest extent and a deep saprolite is preserved. Flat ground is produced that is ideal for larger farms and development. Historically, towns and communities developed in the basins and trench valleys. On the steep, more mountainous terrain, the depth of weathering is very shallow and little saprolite or soil develops. On the steepest slopes, barren rock exposures occur throughout Madison County.

In addition, jointing, faulting, thickness of layering, and metamorphic grade contribute to the resistance of a rock type. Abundant and closely spaced joints and faults increase the exposed surface area of a rock and subsequently cause the rock to weather more easily and form topographic lows. The Laurel Creek trench valley is probably a result of such fracturing across different rock types. Similarly, the thicker and more massive layers are usually more resistant than their thin-layered counterparts. The massive granitoid layers form a topographic high, while the more thinly layered granitoids in the same areas are topographically low.

General Geology

Metamorphosed igneous, volcanic, and sedimentary rocks ranging in age from more than 1 and 1.5 billion years to about 600 million years underlie all of Madison County. All are multiply metamorphosed, folded, and faulted. Other intrusives vary in age from Middle Proterozoic to Cambrian and range from granitic to ultramafic in composition.

Structural Setting

Madison County lies in the Blue Ridge geologic province. Within this province the large structural features that control the outcrop pattern of the rocks and characterize the region are thrust faults. These faults separate the major rock sequences and thus serve to stack the sequences on top of one another. Each component thrust sheet consists of deformed and metamorphosed rock transported tens to hundreds of miles to the northwest. The rocks within each thrust sheet vary in tectonic history, rock type, and metamorphism. The internal contacts within the thrust sheet may either be intrusive, stratigraphic, or faulted.

Recognition and confirmation of this composite thrust fault concept were based on initial geologic mapping of unmetamorphosed Paleozoic clastic and carbonate rocks surrounded by regionally metamorphosed rocks (e.g., Hot Springs window) and subsequent mapping of crystalline thrust faults elsewhere in the Blue Ridge Mountains.

The rocks found in the major thrust sheets of Madison County are over a billion years old (Mesoproterozoic) and consist primarily of migmatitic biotite-hornblende gneiss, layered biotite granitic gneiss, protomylonitic granitoid gneiss, biotite granitoid gneiss, biotite gneiss, granulite gneiss, and amphibolites *(11)*. They underlie all other rocks in the area and for that reason are referred to as basement. The protoliths of these complexly deformed basement gneisses are not fully understood but are interpreted to be primarily igneous in nature. Age dates have identified three major time periods of igneous activity: 1020-1080 Ma (million years), 1130-1180 Ma, and 1220-1270 Ma *(12)*. The basement rocks of Madison County are an amalgam of these plutons with each progressively younger phase intruding the older igneous bodies. This sequence of events is further complicated by at least one and possibly several very high-grade metamorphic overprintings during the Grenville orogeny approximately 1 billion years ago. In addition multiple zones of mylonitization (ductile deformation) overprint the metamorphic fabrics.

Rock Descriptions

Basement Complex

Geologic map units composed of basement gneisses include migmatitic biotite-hornblende gneiss, Earlies Gap Biotite Gneiss, Sandymush Felsic Gneiss, Doggett Gap Protomylonitic Granitoid Gneiss, Spring Creek Granitoid Gneiss, Max Patch Granite, feldspathic granitoid gneiss, and granulite gneisses *(9, 13)*. A geology map is included with this survey.

Rocks intrusive into the basement gneisses are undeformed but weakly metamorphosed Neoproterozoic Bakersville Metagabbro, Beech Metagranite, and aplite dikes. The Beech Metagranite and aplite dikes occur only in northeastern Madison County southeast of Big Bald, whereas the Bakersville Metagabbro is more widespread.

Industrial minerals produced from these rocks include crushed stone, dimension stone, talc, feldspar, monazite, barite, and magnetite. Prospected occurrences include garnet, high calcium limestone (marble), rare earth elements, thorium, uranium, and sapphire.

The dominant soils developed from the gneisses are Buladean, Chestnut, Porters, Unaka, and Edneyville. Rock outcrops are common along the French Broad River. Additional soils included in this map area are Toecane, Tusquitee, and Tate over colluvium and Dellwood, Reddies, and French over alluvium. The dominant soils developed from the Bakersville Metagabbro are Clifton, Evard, and Cowee. Additional soils included in this map area are Toecane, Tusquitee, and Tate over colluvium and Dellwood, Reddies, and French over alluvium. At elevations below about 4,500 feet, the dominant soils are Wayah and Burton.

Ashe Metamorphic Suite

In eastern Madison County near its juncture with the Buncombe and Yancey County lines, three very small areas of younger rocks are found. Here, rocks of the Neoproterozoic (600-700 million years) Ashe Metamorphic Suite overlie the basement gneisses along the Holland Mountain thrust fault (see geology map). The Ashe Metamorphic Suite consists of varied clastic sediments deposited in deep-water marine rift basins. Interspersed with these sediments are lesser amounts of mafic volcanic rocks and ultramafic rocks. The sediments were metamorphosed into high-grade metagraywackes, muscovite-biotite gneisses and schists, and biotite gneisses and schists. The mafic volcanics were metamorphosed into amphibolites, whereas the ultramafics were variably affected, being completely altered in some places and relatively unaffected in others.

Industrial minerals prospected from the Ashe Metamorphic Suite in Madison County include crushed stone, dimension stone, kyanite, and garnet.

At elevations above about 3,000 feet, the dominant soils developed from the muscovite-biotite gneiss unit and include Buladean, Chestnut, Porters, and Unaka. Rock outcrops are common. Additional soils included in this map area are Tusquitee, Toecane, and Tate over colluvium and Dellwood and Reddies over alluvium. At elevations approximately 3,000 feet and lower, the dominant soils are Evard and Cowee. Additional soils included in this map area are Tate over colluvium and French over alluvium.

Ocoee Supergroup

In the western part of the county metasediments of the Ocoee Supergroup are in contact with the basement gneisses. Units of the Ocoee Supergroup represent very thick deposits of clastic, in part turbidite, sediments laid down in shallow-water marine rift basins along the margin of the continent. The Ocoee Supergroup includes the Snowbird Group, the Great Smoky Group, and the Walden Creek Group. Ocoee Supergroup metasediments are in fault contact with the basement gneisses in some locations and rest unconformably on the basement gneisses in others. The Snowbird Group is the oldest sedimentary rock unit found above the old granitic basement along the entire North Carolina-Tennessee State line. The material that makes up these sediments was derived directly from the old granitic basement. The Longarm Quartzite is a poorly to well sorted, variably feldspathic, locally cross-bedded quartzite with interbeds of pebbly, feldspathic layers common to the lower portion of the sequence. Rare interbeds of metasiltstone and dark gray slate occur in the upper portion. The quartzites, feldspathic quartzites, and conglomeratic quartzites are resistant units. Of the Snowbird Group, the Longarm Quartzite is most commonly a ridge former. These same qualities frequently cause the buildup of talus, boulder fields, and other colluvial deposits on mountain slopes. In the vicinity of Big Sandymush Bald and Little Sandymush Bald, the Great Smoky Group, part of the Ocoee Supergroup, rests in fault contact with the basement gneisses. The Ocoee Supergroup crops out extensively in the areas west of Spring Creek and the Laurel River and northwest of Shelton Laurel (see geology map).

Industrial minerals produced in these rocks include barite, crushed stone, and dimension stone. Prospected occurrences include kyanite and garnet.

The dominant soils developed from the Snowbird, Walden Creek, and the Great Smoky Groups are Soco, Sylco, Ditney, Unicoi, Junaluska, and Brasstown. These soils and the underlying bedrock are susceptible to mass movement when lateral support is removed. Additional soils included in this map area are Northcove and Maymead, which developed over colluvium. At elevations approximately 4,500 feet and higher, the dominant soils developed from the Great Smoky Group unit include Oconaluftee, Guyot, and Cataloochee. Rock outcrops are common. Additional soils included in this map area are Heintooga and Chiltoskie over colluvium.

All of the above rocks have been affected by at least one episode of regional (Barrovian) metamorphism during the Paleozoic Era. This event is characterized by decreasing metamorphic grade from southeast to northwest. The relatively low grade of metamorphism to the northwest had only minor retrograde effects on the basement gneisses but did cause prograde metamorphism in the sedimentary cover sequences.

A major zone of mylonitization up to several miles wide occurs along the western boundary of the basement rocks and affects both the basement and the Ocoee Supergroup cover rocks in western Madison County (see geology map). Similar mylonites occur very widely scattered through the basement gneisses. This mylonitization is Neoacadian (355 to 330 Ma) in age and is characterized by low-grade metamorphism with the development of sericite, muscovite, epidote group minerals, and chlorite *(3)*. This ductile deformation is a product of northwest-directed thrust faulting.

The northwestern edge of this same zone of mylonitization is further deformed by a slightly later brittle deformation that has characteristic breccias to near gouge along fault planes. This Alleghenian deformation (320 to 270 Ma) represents the culmination of northwestward thrusting in Madison County and western North Carolina.

Chilhowee Group

Postdating the deposition of the cover sequences are unmetamorphosed sandstones, conglomerates, and shales of the Cambrian-aged Chilhowee Group, Shady Dolomite, Rome Shale, and Honaker Dolomite. They are typical of the Valley and Ridge geologic province of eastern Tennessee, southwestern Virginia, and northeast Georgia. They occur in western Madison County in the vicinity of Hot Springs. The town of Hot Springs lies in a unique geologic feature called a window. A window is a structural feature associated with thrust faults where the overlying units have been eroded down through the fault exposing rocks below the thrust sheet. It is these window features that helped establish the thrust fault concept for the southern Blue Ridge geologic province.

Industrial minerals produced in these rocks include crushed stone, dimension stone, and barite. Prospected occurrences include agricultural limestone and manganese.

The dominant soils developed from the Chilhowee Group are Calvin, Ditney, and Unicoi. Additional soils included in this map area are Junaluska and Brasstown and Tate and Keener which developed over colluvium.

Unmetamorphosed Igneous Rocks

Unmetamorphosed igneous rocks make up the most recent and the remainder of the rocks in Madison County. They range in composition from granite to granodiorite to trondhjemite. The most notable occurrences are in the eastern part of the county. Granitic to granodioritic pegmatites formed through high-grade regional metamorphism occur locally in bodies too small to map at a regional scale. Trondhjemite dikes of a magmatic origin cross cut the basement gneisses, the Ashe Metamorphic Suite, and the granitic pegmatites. Both the pegmatites and trondhjemites are relatively minor components of the Blue Ridge rocks in Madison County.

Industrial minerals produced in these young igneous rocks include dimension stone, feldspar, and kaolinite/halloysite. Prospected occurrences include beryl.

The dominant soils developed from the gneisses are Buladean, Chestnut, Porters, Unaka, and Edneyville. Rock outcrops are common along the French Broad River. Additional soils included in this map area are Toecane, Tusquitee, and Tate over colluvium and Dellwood, Reddies, and French over alluvium.

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Glossary

Access road. A road constructed to facilitate the use and management of the land. Access roads are designed for limited traffic and typically consist of a cut slope, a roadbed, and a fill outslope.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Allochthonous. Formed elsewhere; moved from its place or origin by earth-building forces.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Alteration zone. An area of mineralogic change in a rock brought about by physical or chemical means.

Aluminosilicate. A silicate mineral enriched in aluminum; kyanite, sillimanite, and muscovite are examples.

Amphibolite. A metamorphic rock composed mostly of an amphibole mineral (usually hornblende) and plagioclase feldspar.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Anthophyllite. Abestiform amphibole mineral that occurs in metamorphosed ultramafic rock.

Anticlinorium. A series of upfolds and downfolds in the rocks that form a general arch.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Aquifer. A water-bearing bed or stratum of permeable rock, sand, or gravel capable of fielding considerable quantities of water to wells or springs.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Arenite. A general name used for a consolidated sedimentary rock composed of sand-sized fragments irrespective of composition.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Arkose. A sandstone containing 25 percent or more of feldspar generally derived from the disintegration of felsic igneous rock.

Arkosic. Feldspar content in arenites (sandstones) generally exceeding 25 percent.

Aspect. The direction in which a slope faces.

Atterberg limits. Atterberg limits are measured for soil materials passing the No. 40 sieve. They include the liquid limit (LL), which is the moisture content at which the soil passes from a plastic to a liquid state, and the plasticity index (PI), which is the water content corresponding to an arbitrary limit between the plastic and semisolid states of consistency of a soil.

Aureole. A zone surrounding an igneous intrusion in which the country rock shows the effects of contact metamorphism.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Ball and burlap harvest. A method of harvesting nursery plants in which burlap is wrapped around a ball of soil that is attached to the root system.

Bare-root harvest. A method of harvesting in which nursery plants are removed from the soil with their roots bare and are packed in moist shipping material.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Basic rock. An igneous rock composed dominantly of dark minerals. The minerals of this rock are comparatively low in silica and rich in bases, such as amphiboles, pyroxenes, biotite, and olivine.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock escarpment. An intermittent to continuous band of rock outcrop usually more than 50 feet in length and 5 feet wide. Commonly associated with moderately steep to very steep soils.

Benchmark soil. A soil of large extent that holds a key position in the soil classification system or is of special significance to farming, engineering, forestry, or other uses.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Biotite. A common rock-forming mineral consisting primarily of ferromagnesian silicate minerals. Color ranges from dark brown to green in thin section. Biotite is commonly referred to as “black mica” because of the natural black color.

Borrow pit. An open excavation from which the soil and underlying material have been removed, generally for use in road construction. Borrow pits support few or no plants without major reclamation. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Broad-based dips. Short sections of access road having a reverse grade that intercept storm water. The dips are spaced about 200 feet apart and are designed to divert water away from stream crossings or steep grades.

Cable logging. A method of moving felled trees to a landing for transport to a processing facility. Most cable logging systems involve use of a truck-mounted drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are yarded and reeled in while one end is lifted or the entire log is suspended. Because this system minimizes road construction, it is used in logging steep side slopes and for reducing operational costs.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or “chain,” of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of metasandstone, slate, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chilled margins. The border area of an igneous intrusion characterized by finer grain size than the interior of the rock mass, due to more rapid cooling.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clastic. Refers to a rock or sediment that contains broken fragments of pre-existing rocks and minerals.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clayey. A general textural term that includes sandy clay, silty clay, and clay. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) containing 35 percent or more clay, by weight, within the control section. The content of rock fragments is less than 35 percent, by volume.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Coastal Plain. The physiographic region of eastern North Carolina that consists of ocean-deposited sediments of sand, silt, and clay. These sediments are in level to rolling areas and vary in thickness.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

Colluvial fan. A fan-shaped area of soils deposited by mass-wasting (direct gravitational action) and local unconcentrated runoff on and at the base of steeper side slopes.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Conformable. Said of the contact of an intrusive body which is aligned with the internal structures of the surrounding rocks.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the “Soil Survey Manual.”

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cove. A gently sloping to very steep, concave colluvial area commonly located at the head of drains and along drainageways in mountainous areas. Coves are long and narrow along drainageways extending up into the mountains and become wide and bowl shaped where streams flow out of the mountains and into the valleys.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Dbh (diameter at breast height). The diameter of a tree at 4.5 feet above the ground level on the uphill side.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Delineation. Each individual area drawn on the map. Soil delineations represent landforms, such as flood plains, terraces, coves, side slopes, and ridges. They contain the named components as well as similar and dissimilar inclusions. A collection of soil delineations with the same name is called a map unit.

Denitrification. The biochemical reduction of nitrate or nitrite to gaseous nitrogen either as molecular nitrogen or as an oxide of nitrogen.

Depression (depressional area). A portion of land surrounded on all sides by higher land. These areas generally do not have outlets for drainage.

Depth class. Refers to the depth to a root-restricting layer. Unless otherwise stated, this layer is understood to be consolidated bedrock. The depth classes in this survey are:

Very shallow	less than 10 inches
Shallow	10 to 20 inches
Moderately deep	20 to 40 inches
Deep	40 to 60 inches
Very deep	more than 60 inches

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep soils, 20 to 40 inches; shallow soils, 10 to 20 inches; and very shallow soils, less than 10 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Dike. A long, narrow cross-cutting mass of igneous rock that extends to or crops out on the land surface.

Diorite. A coarse-grained igneous rock with the composition of andesite (no quartz or orthoclase). It is composed of about 75 percent plagioclase feldspars with the balance being ferromagnesian silicates.

Dispersion (soils). The breakup of compound particles, such as soil aggregates or saprolite, into single grains, resulting in a highly erosive condition. This phenomenon results from the failure of grains to adhere or bond to one another and generally is associated with a high water content in soil containing high levels of sodium.

Dissimilar inclusions (soil). Soils that affect use or management differently than the named components of a map unit. They comprise less than 25 percent each map unit and vary from delineation to delineation. Nonlimiting dissimilar inclusions have soil properties that should not conflict with use and management. Limiting inclusions have soil properties that could interfere with use and management and special considerations may be necessary to overcome them.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming. A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or near the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Where rainfall is high and nearly continuous, however, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Drainageway. A narrow, gently sloping to very steep, concave colluvial area along an intermittent or perennial stream.

Droughty. A restrictive feature; the soil holds too little water for plants during dry periods.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Eroded (soil phase). Because of erosion, the soil has lost an average of 25 to 75 percent of the original A horizon or the uppermost 2 to 6 inches if the original A horizon was less than 8 inches thick.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion classes. Classes based on estimates of past erosion. The classes are as follows:

Class 1.—Soils that have lost some of the original A horizon but on the average less than 25 percent of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). Throughout most areas, the thickness of the surface layer is within the normal range of variability of the uneroded soil. Class 1 erosion typically is not designated in the name of the map unit or in the map symbol.

Class 2.—Soils that have lost an average of 25 to 75 percent of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). Throughout most cultivated areas of class 2 erosion, the surface layer consists of a mixture of the original A horizon and material from below. Some areas may have intricate patterns ranging from uneroded spots to spots where all of the original A horizon has been removed.

Class 3.—Soils that have lost an average of 75 percent or more of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). In most cultivated areas of class 3 erosion, material that was below the original A horizon is exposed. The plow layer consists entirely or largely of this material.

Class 4.—Soils that have lost all of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick) plus some or all of the deeper horizons throughout most of the area. The original soil can be identified only in spots. Some areas may be smooth, but most have an intricate pattern of gullies.

Erosion hazard. A term describing the potential for future erosion, inherent in the soil itself, in inadequately protected areas. The following definitions are based on estimated annual soil loss in metric tons per hectare (values determined by the Universal Soil Loss Equation assuming bare soil conditions and using rainfall and climate factors for North Carolina):

0 tons per hectare	none
Less than 2.5 tons per hectare	slight
2.5 to 10 tons per hectare	moderate
10 to 25 tons per hectare	severe
More than 25 tons per hectare	very severe

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Evapotranspiration. The combined loss of water from a given area through surface evaporation and through transpiration by plants during a specified period.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake (in tables). The rapid movement of water into the soil.

Fault. A surface of rock rupture along which there has been differential movement.

Faulting. The process of fracturing and displacement that produces a fault.

Felsic rock. A general term for light-colored igneous rock and some metamorphic crystalline rock that have an abundance of quartz, feldspars, feldspathoids, and muscovite mica.

Fen (bog). An area of very poorly drained, organic soils that are saturated throughout most of the year. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field border. A strip of perennial vegetation (trees, shrubs, or herbaceous plants) established on the edge of a field to control erosion, provide travel lanes for farm machinery, control competition from adjacent woodland, or provide food and cover for wildlife.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. An area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, slate, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flat. A general term for a level or nearly level surface or small area of land marked by little or no relief.

Flooding. The temporary covering of the soil surface by flowing water from any source, such as overflowing streams, runoff from adjacent or surrounding slopes, and inflow from high tides. The frequency of flooding generally is expressed as none, rare, occasional, or frequent. *None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). The duration of flooding is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month).

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb. Any herbaceous plant not a grass or a sedge.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Gap. A concave, lower area between ridge crests that generally has lesser slope.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Geomorphic surface. A part of the surface of the land that represents an episode of landscape development and consists of one or more landforms. It is a mappable part of the land surface that is defined in terms of morphology (relief, slope, aspect, etc.); origin (erosional, constructional, etc.); age (absolute or relative); and stability of component landforms.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Gneiss. A coarse-grained metamorphic rock in which bands rich in granular minerals alternate with bands that are predominantly schistose minerals. It is commonly formed by the metamorphism of granite.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Granite. A coarse-grained igneous rock dominated by light-colored minerals, consisting of about 50 percent orthoclase and 25 percent quartz with the balance being plagioclase feldspars and ferromagnesian silicates. Granites and granodiorites comprise 95 percent of all intrusive rocks.

Granitoids. A field term for a granitic-looking rock.

Granoblastic. A common metamorphic rock texture in which the mineral grains are equidimensional.

Granodiorite. A plutonic rock roughly intermediate in composition between granite and diorite.

Granofels. A field name for a medium- to coarse-grained granoblastic metamorphic rock with little or no foliation.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Gravelly spot. An area of soils where the content of rock fragments generally less than 3 inches in diameter is more than 15 percent, by volume, in the surface layer, occurring in a map unit in which the surface layer of the dominant soil or soils has less than 15 percent gravel. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size.

Gravel pit. An open excavation in which the soil and underlying material are used as a source of sand and gravel. The excavated material is not crushed for use. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hard to pack (in tables). The soil material is difficult to compact using regular earth-moving equipment.

Head slope. A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-grade metamorphic rocks. Highly metamorphosed rocks, such as gneiss and schist.

High mountains. The part of the landscape that is above an elevation of about 4,600 feet. It is dominated by frigid soil temperatures.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

High-value crop. Crops, such as tobacco, vegetables, and ornamentals, that require a high level of management, are labor intensive, and have a potential for high profit per acre.

High water table (seasonal). The highest level of a saturated zone in the soil (the apparent or perched water table) over a continuous period of more than 2 weeks in most years, but not a permanent water table.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the “Soil Survey Manual.” The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Hydroseeding. Applying seed, fertilizer, and mulch to steep areas by spraying a mixture of those ingredients and water under pressure from a truck.

Hypersthene. A common rock-forming mineral of the orthopyroxene group; indicative of very high-grade metamorphism.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are amphibolite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Intermediate mountains. The part of the landscape that ranges from about 3,000 to 4,800 feet in elevation. It is dominated by mesic soil temperatures.

Intermediate rock. Igneous or metamorphic crystalline rock that is intermediate in composition between mafic and felsic rock.

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Intermontane valley. A narrow, low area surrounded by mountains.

Intermountain hills. Low hills that are in valleys between mountain ranges. They are dominated by mesic soil temperatures.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Kaolinite. An aluminosilicate clay mineral with a 1:1 layer structure; that is, a silicon tetrahedral sheet alternating with an aluminum octahedral sheet. Little or no expansion occurs when water mixes with the clay.

Jointing. The presence of fractures in a rock along which there has been no displacement.

Knoll. A small, low, rounded hill rising above adjacent landforms.

K_{sat}. Saturated hydraulic conductivity. (See Permeability.)

Landfill. An area of accumulated wastes produced by human activities. These areas can be above or below the natural ground level. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size.

Landform. Part of a landscape such as a ridge, mountainslope, hillslope, cove, colluvial fan, drainageway, bench, and flood plain.

Landform position. Part of a landform such as a summit, shoulder slope, nose slope, side slope, toeslope, footslope, and bottomland slope.

Landing. An area where felled trees are brought for loading and transport to a processing facility.

Landscape. A relatively large portion of land. Examples are high, intermediate, and low mountains, intermountain hills, and valleys.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones. (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Leeward. The direction downwind from the point of reference. The area protected from the elements; dry portion of a rain shadow. For example, the side of the ship towards the leeward is its lee side. A vessel heeling under the pressure of the wind is the "lower side."

Linear extensibility. Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Line-out beds. Elevated planting beds where woody ornamentals and Christmas tree seedlings are grown for 1 or 2 years until they are of adequate size for planting and rapid establishment in the field.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Lit-par-lit. The penetration of layered rock by numerous, thin, roughly parallel sheets of granitic material.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loamy. A general textural term that includes coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, and silty clay loam. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) of loamy very fine sand or finer textured material that contains less than 35 percent clay, by weight, within the control section. The content of rock fragments is less than 35 percent, by volume.

Low mountains. The part of the landscape that ranges from about 2,500 to 3,500 feet in elevation. It is dominated by mesic soil temperatures.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low stream terrace. A terrace in an area that floods, commonly 3 to 10 feet higher in elevation than the adjacent flood plain.

Low strength. The soil has a low resistance to deforming, sliding, or failure. It is not strong enough to support loads.

Mafic rock. A dark rock composed predominantly of magnesium silicates. It can contain small amounts of quartz, feldspar, or muscovite mica.

Marine. Of, or belonging to, or caused by the sea.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Mean annual increment. The average annual volume of a stand of trees from the year of origin to the age under consideration.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Meta-arkose. An arkose that has undergone some degree of metamorphism.

Metagraywacke. A metamorphosed, dark gray, firmly indurated coarse-grained sandstone that consists of poorly sorted, angular to subangular grains of quartz and feldspar with a variety of dark rock and mineral fragments embedded in a complex clayey matrix.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Metasedimentary rock. Metamorphosed sedimentary rocks, such as phyllite, metasandstone, and conglomerate.

Micas. A group of silicate minerals characterized by sheet or scale cleavage. Biotite is the ferromagnesian black mica. Muscovite is the potassic white mica.

Microrelief. The concave to convex changes in the land surface occurring over a relatively short distance or within a small area, such as 1 acre.

Mine or quarry (map symbol). An open excavation from which the soil and underlying material have been removed, exposing bedrock; or the surface opening to underground mines. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine,* *medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

Multiply metamorphosed. Metamorphosed more than once.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Muscovite. A nonferromagnesian rock-forming silicate mineral that has tetrahedra arranged in sheets. Commonly called “white mica” and sometimes called potassic mica.

Mylonitized. A rock deformed by extreme granulation and shearing. Commonly associated with faulting.

Native pasture. Pasture that has seeded naturally in native grasses. It is on slopes too steep to manage with modern machinery.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nose slope. A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent.

No-till planting. A method of planting crops in which there is virtually no seedbed preparation. A thin slice of the soil is opened, and the seed is planted at the desired depth.

Nutrient leaching. The movement of soluble fertilizer (and soil-applied pesticides) by percolating water below plant roots and possibly into the water table.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Overstory. The portion of the trees in a forest stand forming the upper crown cover.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to

100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Pegmatite. A small pluton of exceptionally coarse texture, commonly formed at the margin of a batholith characterized by graphic structure. Nearly 90 percent of all pegmatites are simple pegmatites consisting of quartz, orthoclase, and minor percentages of micas.

Perched water table. A saturated zone of water in the soil standing above an unsaturated zone. It is usually caused by abrupt textural changes between soil horizons or the occurrence of compacted layers. These conditions cause percolating water to become restricted or perched within the soil.

Percolation. The movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Perennial stream. A stream, or reach of a stream, that flows continuously throughout the year.

Perennial water. An area that generally provides water for human or livestock consumption; commonly a lake, pond, river, or stream. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as “saturated hydraulic conductivity,” which is defined in the “Soil Survey Manual.” In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as “permeability.” Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Pesticide. Chemical formulations used to control insects and other animals, disease, and plant growth. Common pesticides include insecticides, animal repellents and baits, fungicides, defoliants, and herbicides. Their use and application is controlled by State and Federal regulations.

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Phytophthora root rot. A soil-borne disease caused by the fungus *Phytophthora cinnamomi*. Originally introduced from Asia, the disease is spread by the movement of contaminated soil, water, or infected plant material. Out of a thousand species of woody plants that are hosts to phytophthora root rot, Fraser fir is one of the most susceptible. Growth of the disease is favored by soil and landform conditions that allow for the restricted movement of air and water in the soil. Conditions include high clay contents, saturation by high water tables, flooding and ponding, and water retention for extended periods by a high content of organic matter in the surface layer.

Piedmont. The physiographic region of central North Carolina characterized by rolling landscapes formed from the weathering of residual rock material.

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Pods. Metamorphic rock bodies that are long in one dimension and short in two dimensions with their long axis most commonly parallel to layering.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid or very rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse-grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Porphyritic. Igneous rock texture in which larger crystals are set in a finer-grained ground mass.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Protolith. The unmetamorphosed rock from which a given metamorphic rock was formed by metamorphism.

Rain shadow. A region on the lee side of mountains or hills that receives significantly less rainfall than land on the windward side, because prevailing winds are forced to rise, cool, and thereby lose most of their moisture by precipitation before reaching the lee, while moving across the high ground. An area on the side of a mountain barrier that is sheltered from prevailing winds and rain-bearing clouds, resulting in relatively dry conditions.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3

Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Reforestation. The process in which tree seedlings are planted or become naturally established in an area that was once forested.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Ridge. A long, narrow elevation of the land surface, usually having a sharp crest and steep sides.

Ridge nose. The downward-sloping convex terminal point of a main ridge or a spur ridge.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Rime ice. Windblown ice that accumulates on tree branches mainly on exposed ridges and upper side slopes and at the higher elevations. The weight of the ice can cause branches to break.

Rippable. Rippable bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 drawbar horsepower rating.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop. An area of exposed bedrock in a map unit that has less than 0.1 percent exposed bedrock. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Runoff class (surface). Refers to the rate at which water flows away from the soil over the surface without infiltrating. Six classes of rate of runoff are recognized:

Ponded.—Little of the precipitation and water that runs onto the soil escapes as runoff, and free water stands on the surface for significant periods. The amount of water that is removed from ponded areas by movement through the soil, by plants, or by evaporation is usually greater than the total rainfall. Ponding normally occurs on level and nearly level soils in depressions. The water depth may fluctuate greatly.

Very slow.—Surface water flows away slowly, and free water stands on the surface for long periods or immediately enters the soil. Most of the water passes through the soil, is used by plants, or evaporates. The soils are commonly level or nearly level or are very porous.

Slow.—Surface water flows away so slowly that free water stands on the surface for moderate periods or enters the soil rapidly. Most of the water passes through the soil, is used by plants, or evaporates. The soils are nearly level or very gently sloping, or they are steeper but absorb precipitation very rapidly.

Medium.—Surface water flows away so rapidly that free water stands on the surface for only short periods. Part of the precipitation enters the soil and is used by plants, is lost by evaporation, or moves into underground channels. The soils are nearly level or gently sloping and absorb precipitation at a moderate rate, or they are steeper but absorb water rapidly.

Rapid.—Surface water flows away so rapidly that the period of concentration is brief and free water does not stand on the surface. Only a small part of the water enters the soil. The soils are mainly moderately steep or steep and have moderate or slow rates of absorption.

Very rapid.—Surface water flows away so rapidly that the period of concentration is very brief and free water does not stand on the surface. Only a small part of the water enters the soil. The soils are mainly steep or very steep and absorb precipitation slowly.

Saddle. A localized concave dip in a main ridge where intermittent drainage commences on the adjacent side slope.

Sand. As a soil separate, individual rock or mineral fragments ranging from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sandy. A general textural term that includes coarse sand, sand, fine sand, very fine sand, loamy coarse sand, loamy sand, loamy fine sand, and loamy very fine sand. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) of sand or loamy sand that contains less than 50 percent very fine sand, by weight, within the control section. The content of rock fragments is less than 35 percent, by volume.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprolite. Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Schist. A metamorphic rock that is dominantly fibrous or platy minerals. It has schistose cleavage and is a product of regional metamorphism.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seep. A small area on the landscape where water oozes through the soil and causes the surface to remain wet. The water does not flow on the surface.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Severely eroded spot. An area of soil that has lost an average of 75 percent or more of the original surface layer because of accelerated erosion, occurring in a map unit in which the dominant soil or soils have lost less than 25 percent of the original surface layer. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Short, steep slope. An area of soils that are at least two slope classes steeper than the named soils in the surrounding map unit. Areas identified on the detailed soil maps by a special symbol typically are long, narrow bands that are less than 2 acres in size. (See Slope.)

Shoulder. The position that forms the uppermost inclined surface near the top of a hillslope. It is a transition from backslope to summit. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Side slope. A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar inclusions (soil). Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements. They comprise less than 50 percent each map unit and vary from delineation to delineation.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Skeletal (soils). Soils that contain more than 35 percent, by volume, coarse fragments (gravel, cobbles, stones, and/or boulders).

Skidding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most systems involve pulling the trees with wire cables attached to a bulldozer or a rubber-tired tractor. Generally, felled trees are skidded or pulled with one end lifted to reduce friction and soil disturbance.

Skid trails. A system of bulldozer or tractor trails quickly built to allow for the skidding or pulling of felled trees by a tractor, bulldozer, or skidder to a landing for loading and transport to a processing facility.

Slate. A fine-grained metamorphic rock with well developed slaty cleavage. Formed by the low-grade regional metamorphism of shale.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, slope classes are as follows:

Nearly level	0 to 3 percent
Gently sloping	2 to 8 percent
Strongly sloping	8 to 15 percent
Moderately steep	15 to 30 percent
Steep	30 to 50 percent
Very steep	50 to 95 percent

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow air drainage. Cold, moist, heavy air moves slowly (drains) up and down valleys and coves, and in drainageways. Where this air accumulates in low areas, frost pockets occur.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil compaction. An alteration of soil structure that ultimately can affect the biological and chemical properties of the soil. Compaction decreases the extent of voids and increases bulk density.

Soil creep. The slow mass movement of soil and soil materials downslope, primarily under the influence of gravity, facilitated by water saturation and by alternating periods of freezing and thawing.

Soil map unit. A kind of soil or miscellaneous area or a combination of two or more soils or one or more soils and one or more miscellaneous areas that can be shown at the scale of mapping for the defined purposes and objectives of the soil survey. Soil map units generally are designed to reflect significant differences in use and management among the soils of a survey area.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Soil slippage potential. The observation of surface slippage features that indicate a mass of soil will possibly slip when the vegetation is removed and soil water is at or near saturation or when the slope is undercut. Saturating a slope with water from altered drainage or irrigation has an effect on slippage. It is an important consideration for engineering practices, such as constructing roads and buildings, and for forestry practices. Soil slippage potential classes are estimated by observing slope; lithology, including contrasting lithologies; strike and dip; surface drainage patterns; and occurrences of such features as slip scars and slumps. The following classes are used: *high* (unstable), *medium* (moderately unstable), and *low* (slightly unstable or stable).

Soil strength. The load-supporting capacity of a soil at specific moisture and density conditions.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Specialty crop. Crops, such as Fraser fir grown for use as Christmas trees, that require intensive management and a specific combination of soils and climate.

Spring. A small area on the landscape where water flows naturally through the soil onto the surface.

Spur ridge. A sharply convex portion of a mountain side slope extending from the main ridge to some point at a lower elevation.

Stand density. The degree to which an area is covered with living trees. It is usually expressed in units of basal areas per acre, number of trees per acre, or the percentage of ground covered by the tree canopy as viewed from above.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stony spot. An area where 0.01 to 0.1 percent of the surface is covered by rock fragments larger than 10 inches in diameter. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsidence. A pronounced reduction in volume in some drained soils because of the removal of water, shrinkage of organic material, and the oxidation of organic compounds. Generally associated with soils that have a high content of organic matter.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in content of organic matter than the overlying surface layer.

Suitability ratings. Ratings for the degree of suitability of soils for pasture, crops, woodland, and engineering uses. The ratings and the general criteria used for their selection are as follows:

Well suited.—The intended use may be initiated and maintained by using only the standard materials and methods typically required for that use. Good results can be expected.

Suited.—The limitations affecting the intended use make special planning, design, or maintenance necessary.

Poorly suited.—The intended use is difficult or costly to initiate and maintain because of certain soil properties, such as steep slopes, a severe hazard of erosion, a high water table, low fertility, and a hazard of flooding. Major soil reclamation, special design, or intensive management practices are needed.

Unsuited.—The intended use is very difficult or costly to initiate and maintain, and thus it generally should not be undertaken.

Summit. The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a stream, river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.”

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topography. The relative positions and elevations of the natural or manmade features of an area that describe the configuration of its surface.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Ultramafic. A plutonic rock composed chiefly of mafic minerals, frequently monomineralic rocks.

Underlying material. Technically the C horizon; the part of the soil below the biologically altered A and B horizons.

Understory. The trees and other woody species growing under a more or less continuous cover of branches and foliage formed collectively by the upper portions of adjacent trees and other woody growth.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Very stony spot. An area where 0.1 to 3.0 percent of the surface is covered by rock fragments larger than 10 inches in diameter. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size.

Vitreous. Having the appearance and luster of glass.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Water table (apparent). A thick zone of free water in the soil. The apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table (perched). A saturated zone of water in the soil standing above an unsaturated zone.

Water turnouts. Small, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and to divert water off and away from the road surface.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth’s surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse-grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wetness. A general term applied to soils that hold water at or near the surface long enough to be a common management problem.

Wet spot. An area of somewhat poorly drained to very poorly drained soils that are at least two drainage classes wetter than the named soils in the surrounding map unit. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size. (See Drainage class.)

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windswept. A phase of a soil map unit where hardwood trees have been stunted, twisted, and gnarled due to exposure to high winter winds and frequent ice storms.

Windthrow. The uprooting and tipping over of trees by the wind.

Windward. The direction from which the wind is blowing at the time in question. The area exposed to the elements; wet portion of a rain shadow. For example, the side of a ship which is towards the windward is the weather side. If the vessel is heeling under the pressure of the wind, this will be the “higher side.”

Yarding paths. The paths left by cable-yarded logs as they were pulled uphill or downhill to a nearby area.

Yield (forestland). The volume of wood fiber from trees harvested in a certain unit of area. Yield is usually measured in board feet or cubic feet per acre.

Tables

Table 1.—Temperature and Precipitation

(Recorded in the period 1971-2000 at Marshall, North Carolina)

	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
Month	Average daily maximum	Average daily minimum	Average daily	Maximum temp. higher than--	Minimum temp. lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snow-fall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January--	45.5	21.0	33.3	70	-3	20	3.39	2.01	4.63	8	5.3
February-	49.9	22.3	36.1	75	2	9	3.38	1.95	4.65	7	4.1
March----	58.3	28.7	43.5	82	10	30	4.05	2.52	5.43	8	3.5
April----	66.8	35.5	51.2	86	22	93	3.31	1.72	4.70	8	0.9
May------	74.6	45.2	59.9	87	31	315	3.89	2.42	5.21	8	0.0
June-----	81.3	54.2	67.8	91	39	533	3.58	2.27	4.77	8	0.0
July-----	84.9	59.4	72.2	93	50	687	3.76	2.36	5.01	8	0.0
August---	83.8	58.1	71.0	94	48	649	3.85	2.08	5.40	8	0.0
September	78.3	51.8	65.1	91	35	452	2.94	1.34	4.31	6	0.0
October--	68.6	38.6	53.6	84	23	175	2.37	0.90	3.60	5	0.0
November-	58.2	30.4	44.3	78	15	37	2.97	1.97	3.88	7	0.5
December-	49.1	24.2	36.7	72	4	13	2.77	1.50	3.88	7	2.9
Yearly:											
Average	66.6	39.1	52.9	---	---	---	---	---	---	---	---
Extreme	100	-18	---	95	-5	---	---	---	---	---	---
Total--	---	---	---	---	---	3,013	40.26	35.20	45.09	84	17.2

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

Table 2.—Freeze Dates in Spring and Fall

(Recorded in the period 1971-2000 at Marshall, North Carolina)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 12	May 2	May 16
2 years in 10 later than--	Apr. 7	Apr. 27	May 11
5 years in 10 later than--	Mar. 28	Apr. 16	Apr. 30
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 17	Oct. 8	Sept. 30
2 years in 10 earlier than--	Oct. 23	Oct. 14	Oct. 4
5 years in 10 earlier than-	Nov. 5	Oct. 24	Oct. 12

Table 3.—Growing Season

(Recorded in the period 1971-2000 at Marshall, North Carolina)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	194	168	145
8 years in 10	203	176	151
5 years in 10	221	190	163
2 years in 10	238	205	176
1 year in 10	247	213	182

Table 4.—Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
AcD	Ashe-Cleveland-Rock outcrop complex, 15 to 30 percent slopes, very stony	915	0.3
ArE	Ashe-Cleveland-Rock outcrop complex, 30 to 50 percent slopes, very bouldery	3,973	1.4
ArF	Ashe-Cleveland-Rock outcrop complex, 50 to 95 percent slopes, very bouldery	8,641	3.0
BaA	Biltmore loamy sand, 0 to 3 percent slopes, occasionally flooded	488	0.2
BkB2	Braddock clay loam, 2 to 8 percent slopes, moderately eroded	54	*
BkC2	Braddock clay loam, 8 to 15 percent slopes, moderately eroded	187	*
BkD2	Braddock clay loam, 15 to 30 percent slopes, moderately eroded	105	*
BnD	Buladean-Chestnut complex, 15 to 30 percent slopes, stony	10,125	3.5
BnE	Buladean-Chestnut complex, 30 to 50 percent slopes, stony	28,779	10.0
BnF	Buladean-Chestnut complex, 50 to 95 percent slopes, stony	24,704	8.6
CaD	Calvin channery silt loam, 15 to 30 percent slopes	146	*
CaE	Calvin channery silt loam, 30 to 50 percent slopes	140	*
CaF	Calvin channery silt loam, 50 to 95 percent slopes	107	*
CfF	Cataska-Sylco-Rock outcrop complex, 50 to 95 percent slopes, very stony	7,605	2.6
ChD	Cheoah-Jeffrey complex, 15 to 30 percent slopes, stony	277	*
ChE	Cheoah-Jeffrey complex, 30 to 50 percent slopes, stony	712	0.2
ChF	Cheoah-Jeffrey complex, 50 to 95 percent slopes, stony	1,114	0.4
CsD	Chestoa sandy loam, 15 to 30 percent slopes	64	*
CsE	Chestoa sandy loam, 30 to 50 percent slopes	109	*
CsF	Chestoa sandy loam, 50 to 95 percent slopes	63	*
CtB2	Clifton clay loam, 2 to 8 percent slopes, moderately eroded	86	*
CtC2	Clifton clay loam, 8 to 15 percent slopes, moderately eroded	2,443	0.8
CtD2	Clifton clay loam, 15 to 30 percent slopes, moderately eroded	6,653	2.3
CtE2	Clifton clay loam, 30 to 50 percent slopes, moderately eroded	2,957	1.0
CxC	Clifton-Urban land complex, 2 to 15 percent slopes	96	*
DeA	Dellwood-Reddies complex, 0 to 3 percent slopes, occasionally flooded	1,343	0.5
DrB	Dillard loam, 1 to 5 percent slopes, rarely flooded	143	*
DtD	Ditney-Unicoi complex, 15 to 30 percent slopes, very stony	748	0.3
DuE	Ditney-Unicoi complex, 30 to 50 percent slopes, very rocky	1,901	0.7
DuF	Ditney-Unicoi complex, 50 to 95 percent slopes, very rocky	4,560	1.6
EdD	Edneyville-Chestnut complex, 15 to 30 percent slopes, stony	214	*
EdE	Edneyville-Chestnut complex, 30 to 50 percent slopes, stony	853	0.3
EdF	Edneyville-Chestnut complex, 50 to 95 percent slopes, stony	1,075	0.4
EfA	Ela loam, 0 to 2 percent slopes, frequently flooded	198	*
EvD2	Evard-Cowee complex, 15 to 30 percent slopes, moderately eroded	6,253	2.2
EvE2	Evard-Cowee complex, 30 to 50 percent slopes, moderately eroded	13,628	4.7
EvF2	Evard-Cowee complex, 50 to 95 percent slopes, moderately eroded	807	0.3
EwD	Evard-Cowee complex, 15 to 30 percent slopes, stony	3,185	1.1
EwE	Evard-Cowee complex, 30 to 50 percent slopes, stony	3,181	1.1
EwF	Evard-Cowee complex, 50 to 95 percent slopes, stony	424	0.1
FnD2	Fannin sandy clay loam, 15 to 30 percent slopes, moderately eroded	19	*
FrA	French loam, 0 to 3 percent slopes, occasionally flooded	2,745	1.0
HcE	Heintooga-Chiltoskie complex, 30 to 50 percent slopes, very stony	97	*
HpA	Hemphill clay loam, 0 to 3 percent slopes, rarely flooded	37	*
JbD	Junaluska-Brasstown complex, 15 to 30 percent slopes	1,508	0.5
JbE	Junaluska-Brasstown complex, 30 to 50 percent slopes	1,600	0.6
JbF	Junaluska-Brasstown complex, 50 to 95 percent slopes	137	*
KnC	Keener loam, 8 to 15 percent slopes, stony	1	*
MwC	Mars Hill-Walnut complex, 8 to 15 percent slopes, stony	18	*
MwD	Mars Hill-Walnut complex, 15 to 30 percent slopes, stony	2,823	1.0
MwE	Mars Hill-Walnut complex, 30 to 50 percent slopes, stony	10,842	3.8
MwF	Mars Hill-Walnut complex, 50 to 95 percent slopes, stony	3,898	1.3
MyB	Maymead-Northcove complex, 2 to 8 percent slopes, stony	18	*
NhC	Northcove-Maymead complex, 8 to 15 percent slopes, stony	730	0.3
NtD	Northcove-Maymead complex, 15 to 30 percent slopes, very stony	3,751	1.3
NtE	Northcove-Maymead complex, 30 to 50 percent slopes, very stony	4,179	1.4
OwC	Oconaluftee-Guyot-Cataloochee complex, windswept, 8 to 15 percent slopes, bouldery	4	*

See footnote at end of table.

Table 4.—Acreage and Proportionate Extent of the Soils—Continued

Map symbol	Soil name	Acres	Percent
OwD	Oconaluftee-Guyot-Cataloochee complex, windswept, 15 to 30 percent slopes, bouldery	34	*
OwE	Oconaluftee-Guyot-Cataloochee complex, windswept, 30 to 50 percent slopes, bouldery	108	*
OwF	Oconaluftee-Guyot-Cataloochee complex, windswept, 50 to 95 percent slopes, bouldery	161	*
PwC	Porters-Unaka complex, 8 to 15 percent slopes, stony	146	*
PwD	Porters-Unaka complex, 15 to 30 percent slopes, stony	2,338	0.8
PwE	Porters-Unaka complex, 30 to 50 percent slopes, stony	7,244	2.5
PxF	Porters-Unaka complex, 50 to 95 percent slopes, rocky	9,431	3.3
RbA	Reddies sandy loam, 0 to 3 percent slopes, occasionally flooded	407	0.1
RcF	Rock outcrop-Cataska complex, 30 to 95 percent slopes, very stony	407	0.1
RhD	Rock outcrop-Chestoa complex, 8 to 30 percent slopes, very bouldery	61	*
RhF	Rock outcrop-Chestoa complex, 30 to 95 percent slopes, very bouldery	163	*
RkF	Rock outcrop-Cleveland complex, 30 to 95 percent slopes, very bouldery	715	0.2
RoF	Rock outcrop-Oteen complex, 30 to 95 percent slopes, very bouldery	1,991	0.7
RpF	Rock outcrop-Unicoi complex, 30 to 95 percent slopes, very bouldery	152	*
RsA	Rosman fine sandy loam, 0 to 3 percent slopes, occasionally flooded	252	*
SoD	Soco-Stecoah complex, 15 to 30 percent slopes, stony	2,221	0.8
SoE	Soco-Stecoah complex, 30 to 50 percent slopes, stony	4,934	1.7
SoF	Soco-Stecoah complex, 50 to 95 percent slopes, stony	5,058	1.8
StB	Statler loam, 1 to 5 percent slopes, rarely flooded	301	0.1
SwD	Sylco-Cataska complex, 15 to 30 percent slopes, very rocky	313	0.1
SwE	Sylco-Cataska complex, 30 to 50 percent slopes, very rocky	1,510	0.5
SyD	Sylco-Soco complex, 15 to 30 percent slopes, stony	1,652	0.6
SyE	Sylco-Soco complex, 30 to 50 percent slopes, stony	6,845	2.4
SzF	Sylco-Soco complex, 50 to 95 percent slopes, very stony	10,450	3.6
TaB	Tate loam, 2 to 8 percent slopes	981	0.3
TaC	Tate loam, 8 to 15 percent slopes	4,259	1.5
TaD	Tate loam, 15 to 30 percent slopes	4,444	1.5
TkC	Tate loam, 8 to 15 percent slopes, very stony	17	*
TkD	Tate loam, 15 to 30 percent slopes, very stony	383	0.1
TmC	Tate-Urban land complex, 2 to 15 percent slopes	30	*
ToD	Toecane very cobbly loam, 15 to 30 percent slopes, extremely bouldery	13	*
ToE	Toecane very cobbly loam, 30 to 50 percent slopes, extremely bouldery	24	*
TrC	Toecane-Tusquitee complex, 8 to 15 percent slopes, bouldery	1,911	0.7
TsD	Toecane-Tusquitee complex, 15 to 30 percent slopes, very bouldery	13,204	4.6
TsE	Toecane-Tusquitee complex, 30 to 50 percent slopes, very bouldery	9,577	3.3
TuD	Tusquitee-Toecane complex, 15 to 30 percent slopes, stony	1,226	0.4
TwB	Tusquitee-Whiteside complex, 2 to 8 percent slopes	129	*
TwC	Tusquitee-Whiteside complex, 8 to 15 percent slopes	1,310	0.5
UcB	Udifluvents, sandy, 0 to 5 percent slopes, frequently flooded	101	*
Ud	Udorthents, loamy	681	0.2
UfB	Udorthents-Urban land complex, 0 to 5 percent slopes, occasionally flooded	125	*
UhE	Udorthents-Urban land complex, 2 to 50 percent slopes	1,714	0.6
UkE	Unaka-Rock outcrop complex, 30 to 50 percent slopes, very bouldery	88	*
UkF	Unaka-Rock outcrop complex, 50 to 95 percent slopes, very bouldery	692	0.2
UrD	Unicoi-Rock outcrop complex, 8 to 30 percent slopes, very bouldery	55	*
UsB	Unison loam, 2 to 8 percent slopes	281	*
UsC	Unison loam, 8 to 15 percent slopes	682	0.2
UsD	Unison loam, 15 to 30 percent slopes	269	*
W	Water	1,608	0.6
WaC2	Walnut-Oteen-Mars Hill complex, 8 to 15 percent slopes, moderately eroded	8	*
WaD2	Walnut-Oteen-Mars Hill complex, 15 to 30 percent slopes, moderately eroded	2,997	1.0
WaE2	Walnut-Oteen-Mars Hill complex, 30 to 50 percent slopes, moderately eroded	9,745	3.4
WoF	Walnut-Oteen-Rock outcrop complex, 50 to 95 percent slopes	3,756	1.3
WrC	Wayah-Burton complex, windswept, 8 to 15 percent slopes, bouldery	10	*
WrD	Wayah-Burton complex, windswept, 15 to 30 percent slopes, bouldery	12	*

See footnote at end of table.

Table 4.—Acreage and Proportionate Extent of the Soils—Continued

Map symbol	Soil name	Acres	Percent
WrE	Wayah-Burton complex, windswept, 30 to 50 percent slopes, bouldery-------	14	*
WsF	Wayah-Burton complex, windswept, 50 to 95 percent slopes, very rocky-----	7	*
WtB	Whiteside loam, 2 to 8 percent slopes-----------------------------------	128	*
	Total---	288,838	100.0

* Less than 0.1 percent.

Table 5.—Orchard and Ornamental Crops

(Please refer to the “Detailed Soil Map Units” and the “Use and management of the soils” sections for information on map unit composition, soil properties, management concerns, and considerations. An onsite investigation is recommended to determine site specific conditions, especially on flood plains, in drainageways, in map units with greater than 30 percent slopes, and on sites above elevations of about 4,000 feet. “Slope” is considered as a limitation for safe equipment use. See text for definitions of "well suited," "suited," "poorly suited," and "unsuited”)

Soil name and map symbol	Apples	Fraser fir*	Ball & burlap	Line-out** beds	Vegetables***
AcD:					
Ashe	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones
Cleveland	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
ArE, ArF:					
Ashe	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones
Cleveland	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
BaA:					
Biltmore	Unsuited flooding droughty climate-frost	Unsuited flooding droughty low elevation	Unsuited flooding too sandy	Unsuited flooding droughty climate-frost	Well suited flooding droughty climate-frost
BkB2:					
Braddock	Well suited	Poorly suited high clay phytophthora warm aspect	Poorly suited high clay	Unsuited high clay phytophthora	Well suited high clay eroded
BkC2:					
Braddock	Well suited	Poorly suited high clay phytophthora warm aspect	Poorly suited high clay	Unsuited high clay phytophthora slope	Suited high clay eroded slope
BkD2:					
Braddock	Suited slope	Poorly suited slope high clay phytophthora warm aspect	Poorly suited slope high clay	Unsuited slope high clay phytophthora	Poorly slope high clay eroded
BnD:					
Buladean	Poorly suited slope low clay	Poorly suited slope warm aspect	Poorly suited slope low clay	Poorly suited slope	Poorly slope

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir*	Ball & burlap	Line-out** beds	Vegetables***
BnD:					
Chestnut	Poorly suited slope depth to rock low clay	Poorly suited slope depth to rock warm aspect	Poorly suited slope low clay depth to rock	Poorly suited slope depth to rock	Unsuited slope depth to rock
BnE:					
Buladean	Poorly suited slope low clay	Poorly suited slope warm aspect	Poorly suited slope low clay	Poorly suited slope	Unsuited slope
Chestnut	Poorly suited slope depth to rock low clay	Poorly suited slope depth to rock warm aspect	Poorly suited slope low clay depth to rock	Poorly suited slope depth to rock	Unsuited slope depth to rock
BnF:					
Buladean	Unsuited slope low clay	Unsuited slope warm aspect	Unsuited slope low clay	Unsuited slope	Unsuited slope
Chestnut	Unsuited slope depth to rock low clay	Unsuited slope depth to rock warm aspect	Unsuited slope low clay depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
CaD:					
Calvin	Poorly suited slope depth to rock small stones	Poorly suited slope depth to rock warm aspect	Poorly suited slope small stones depth to rock	Poorly suited slope small stones depth to rock	Poorly suited slope small stones depth to rock
CaE, CaF:					
Calvin	Unsuited slope depth to rock small stones	Unsuited slope depth to rock warm aspect	Unsuited slope small stones depth to rock	Unsuited slope small stones depth to rock	Unsuited slope small stones depth to rock
CfF:					
Cataska	Unsuited slope depth to rock small stones	Unsuited slope depth to rock warm aspect	Unsuited slope small stones depth to rock	Unsuited slope depth to rock small stones	Unsuited slope depth to rock small stones
Sylco	Unsuited slope depth to rock small stones	Unsuited slope depth to rock warm aspect	Unsuited slope small stones depth to rock	Unsuited slope small stones depth to rock	Unsuited slope small stones depth to rock
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
ChD:					
Cheoah	Poorly suited slope climate-frost	Suited slope	Suited slope low clay	Suited slope climate-frost	Poorly slope climate-frost
Jeffrey	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir*	Ball & burlap	Line-out** beds	Vegetables***
ChE:					
Cheoah	Poorly suited slope climate-frost	Suited slope	Poorly suited slope low clay	Poorly suited slope climate-frost	Unsuited slope
Jeffrey	Unsuited slope depth to rock climate-frost	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
ChF:					
Cheoah	Unsuited slope	Unsuited slope	Unsuited slope	Unsuited slope	Unsuited slope
Jeffrey	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
CsD, CsE, CsF:					
Chestoa	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
CtB2:					
Clifton	Well suited	Poorly suited high clay warm aspect phytophthora	Poorly suited high clay	Unsuited high clay phytophthora slope	Well suited high clay eroded
CtC2:					
Clifton	Well suited	Poorly suited high clay warm aspect phytophthora	Poorly suited high clay	Unsuited high clay phytophthora slope	Suited high clay eroded slope
CtD2:					
Clifton	Suited slope	Poorly suited slope high clay phytophthora warm aspect	Poorly suited slope high clay	Unsuited slope high clay phytophthora	Poorly slope high clay eroded
CtE2:					
Clifton	Poorly suited slope	Poorly suited high clay phytophthora warm aspect	Poorly suited slope high clay	Unsuited slope high clay phytophthora	Unsuited slope high clay eroded
CxC:					
Clifton	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Urban land	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
DeA:					
Dellwood	Unsuited flooding droughty climate-frost	Poorly suited flooding droughty low elevation	Poorly suited flooding too sandy small stones	Poorly suited flooding droughty small stones climate-frost	Poorly flooding droughty small stones climate-frost

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir*	Ball & burlap	Line-out** beds	Vegetables***
DeA:					
Reddies	Unsuited flooding droughty climate-frost	Poorly suited flooding droughty low elevation	Poorly suited flooding too sandy	Suited flooding droughty climate-frost	Suited flooding droughty climate-frost
DrB:					
Dillard	Poorly suited climate-frost flooding	Poorly suited high clay phytophthora flooding	Poorly suited flooding phytophthora	Poorly suited surface clay phytophthora flooding	Well suited flooding
DtD:					
Ditney	Unsuited slope depth to rock	Unsuited slope depth to rock warm aspect	Unsuited slope depth to rock low clay	Unsuited slope depth to rock	Unsuited slope depth to rock
Unicoi	Unsuited slope depth to rock small stones	Unsuited slope depth to rock small stones	Unsuited slope small stones depth to rock	Unsuited slope depth to rock small stones	Unsuited slope depth to rock small stones
DuE, DuF:					
Ditney	Unsuited slope depth to rock	Unsuited slope depth to rock warm aspect	Unsuited slope depth to rock low clay	Unsuited slope depth to rock	Unsuited slope depth to rock
Unicoi	Unsuited slope depth to rock small stones	Unsuited slope depth to rock small stones warm aspect	Unsuited slope small stones low clay depth to rock	Unsuited slope depth to rock small stones	Unsuited slope depth to rock small stones
EdD:					
Edneyville	Poorly suited slope low clay	Poorly suited slope warm aspect	Suited slope low clay	Poorly suited slope	Poorly suited slope
Chestnut	Poorly suited slope depth to rock low clay	Poorly suited slope depth to rock warm aspect	Poorly suited slope low clay depth to rock	Poorly suited slope depth to rock	Poorly suited slope depth to rock
EdE:					
Edneyville	Poorly suited slope low clay	Poorly suited slope warm aspect	Poorly suited slope low clay	Poorly suited slope	Unsuited slope
Chestnut	Poorly suited slope depth to rock low clay	Poorly suited slope depth to rock warm aspect	Poorly suited slope low clay depth to rock	Poorly suited slope depth to rock	Unsuited slope depth to rock
EdF:					
Edneyville	Unsuited slope low clay	Unsuited slope warm aspect	Unsuited slope low clay	Unsuited slope	Unsuited slope
Chestnut	Unsuited slope depth to rock low clay	Unsuited slope depth to rock warm aspect	Unsuited slope low clay depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir*	Ball & burlap	Line-out** beds	Vegetables***
EfA:					
Ela	Unsuited flooding wetness climate-frost	Unsuited flooding wetness phytophthora	Unsuited flooding wetness	Unsuited flooding wetness phytophthora	Unsuited flooding wetness
EvD2:					
Evard	Suited slope eroded	Poorly suited slope warm aspect phytophthora	Suited slope eroded	Poorly suited slope surface clay phytophthora	Poorly slope eroded
Cowee	Poorly suited slope depth to rock eroded	Poorly suited slope depth to rock warm aspect	Poorly suited slope depth to rock eroded	Poorly suited slope surface clay depth to rock	Poorly slope depth to rock eroded
EvE2:					
Evard	Poorly suited slope eroded	Poorly suited slope warm aspect phytophthora	Poorly suited slope eroded	Poorly suited slope surface clay phytophthora	Unsuited slope eroded
Cowee	Poorly suited slope depth to rock eroded	Poorly suited slope depth to rock warm aspect	Poorly suited slope depth to rock eroded	Poorly suited slope surface clay depth to rock	Unsuited slope depth to rock eroded
EvF2:					
Evard	Unsuited slope eroded	Unsuited slope warm aspect phytophthora	Unsuited slope eroded	Unsuited slope surface clay phytophthora	Unsuited slope eroded
Cowee	Unsuited slope depth to rock eroded	Unsuited slope depth to rock warm aspect	Unsuited slope depth to rock eroded	Unsuited slope surface clay depth to rock	Unsuited slope depth to rock eroded
EwD:					
Evard	Suited slope	Poorly suited slope warm aspect	Suited slope	Poorly suited slope surface clay	Poorly slope
Cowee	Poorly suited slope depth to rock	Poorly suited slope depth to rock warm aspect	Poorly suited slope depth to rock	Poorly suited slope surface clay depth to rock	Poorly slope depth to rock
EwE:					
Evard	Poorly suited slope	Poorly suited slope warm aspect	Poorly suited slope	Poorly suited slope surface clay	Unsuited slope
Cowee	Poorly suited slope depth to rock	Poorly suited slope depth to rock warm aspect	Poorly suited slope depth to rock	Poorly suited slope surface clay depth to rock	Unsuited slope depth to rock
EwF:					
Evard	Unsuited slope	Unsuited slope warm aspect	Unsuited slope	Unsuited slope	Unsuited slope

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir*	Ball & burlap	Line-out** beds	Vegetables***
EwF:					
Cowee	Unsuited slope depth to rock	Unsuited slope depth to rock warm aspect	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
FnD2:					
Fannin	Suited slope	Poorly suited slope warm aspect phytophthora	Suited slope eroded	Poorly suited slope surface clay phytophthora	Poorly slope eroded
FrA:					
French	Unsuited flooding wetness climate-frost	Unsuited flooding wetness phytophthora	Poorly suited flooding wetness	Suited flooding wetness phytophthora climate-frost	Suited flooding wetness climate-frost
HcE:					
Heintooga	Unsuited slope large stones climate	Unsuited slope large stones climate	Unsuited slope large stones climate	Unsuited slope large stones climate	Unsuited slope large stones climate
Chiltoskie	Unsuited slope large stones climate	Unsuited slope large stones climate	Unsuited slope large stones climate	Unsuited slope large stones climate	Unsuited slope large stones climate
HpA:					
Hemphill	Unsuited wetness climate-frost flooding	Unsuited wetness phytophthora flooding	Unsuited wetness high clay flooding	Unsuited wetness surface clay flooding	Unsuited wetness high clay flooding
JbD:					
Junaluska	Poorly suited slope depth to rock	Poorly suited slope depth to rock warm aspect	Poorly suited slope depth to rock	Poorly suited slope depth to rock	Poorly slope depth to rock
Brasstown	Suited slope	Poorly suited slope warm aspect	Suited slope	Poorly suited slope	Poorly slope
JbE:					
Junaluska	Poorly suited slope depth to rock	Poorly suited slope depth to rock warm aspect	Poorly suited slope depth to rock	Poorly suited slope depth to rock	Unsuited slope depth to rock
Brasstown	Suited slope	Poorly suited slope warm aspect	Poorly suited slope	Poorly suited slope	Unsuited slope
JbF:					
Junaluska	Unsuited slope depth to rock	Unsuited slope depth to rock warm aspect	Unsuited slope low clay depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
Brasstown	Unsuited slope	Unsuited slope	Unsuited slope	Unsuited slope	Unsuited slope

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir*	Ball & burlap	Line-out** beds	Vegetables***
KnC:					
Keener	Suited climate-frost	Suited phytophthora low elevation	Suited slope	Suited slope climate-frost	Suited slope climate-frost
MwC:					
Mars Hill	Suited low clay	Poorly suited warm aspect slope	Suited slope	Poorly suited slope	Suited slope
Walnut	Poorly suited low clay depth to rock	Poorly suited warm aspect depth to rock warm aspect	Poorly suited slope depth to rock low clay	Poorly suited slope depth to rock	Poorly suited slope depth to rock
MwD:					
Mars Hill	Suited slope low clay	Poorly suited slope warm aspect	Suited slope low clay	Poorly suited slope	Poorly suited slope
Walnut	Poorly suited slope depth to rock low clay	Poorly suited slope depth to rock warm aspect	Poorly suited slope low clay depth to rock	Poorly suited slope depth to rock	Poorly suited slope depth to rock
MwE:					
Mars Hill	Poorly suited slope low clay	Poorly suited slope warm aspect	Poorly suited slope low clay	Poorly suited slope	Unsuited slope
Walnut	Poorly suited slope depth to rock low clay	Poorly suited slope depth to rock warm aspect	Poorly suited slope low clay depth to rock	Poorly suited slope depth to rock	Unsuited slope depth to rock
MwF:					
Mars Hill	Unsuited slope low clay	Unsuited slope warm aspect	Unsuited slope	Unsuited slope	Unsuited slope
Walnut	Unsuited slope depth to rock low clay	Unsuited slope depth to rock warm aspect	Unsuited slope low clay depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
MyB:					
Maymead	Suited climate-frost low clay	Suited low elevation	Suited low clay	Suited climate-frost	Suited climate-frost
Northcove	Unsuited large stones climate-frost	Unsuited large stones	Unsuited large stones	Unsuited large stones	Unsuited large stones
NhC:					
Northcove	Unsuited large stones climate-frost	Unsuited large stones	Unsuited large stones	Unsuited large stones	Unsuited large stones
Maymead	Suited climate-frost low clay	Suited large stones	Suited low clay slope	Suited slope climate-frost	Suited slope climate-frost

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir*	Ball & burlap	Line-out** beds	Vegetables***
NtD, NtE:					
Northcove	Unsuited slope large stones climate-frost	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones
Maymead	Unsuited slope large stones climate-frost	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones	Poorly slope large stones
OwC, OwD, OwE, OwF:					
Oconaluftee	Unsuited slope climate large stones	Unsuited slope climate large stones	Unsuited slope climate large stones	Unsuited slope climate large stones	Unsuited slope climate large stones
Guyot	Unsuited slope depth to rock climate large stones	Unsuited slope depth to rock climate large stones	Unsuited slope depth to rock climate large stones	Unsuited slope depth to rock climate large stones	Unsuited slope depth to rock climate large stones
Cataloochee	Unsuited slope depth to rock climate large stones	Unsuited slope depth to rock climate large stones	Unsuited slope depth to rock climate large stones	Unsuited slope depth to rock climate large stones	Unsuited slope depth to rock climate large stones
PwC:					
Porters	Poorly suited climate-frost low clay	Well suited	Suited low clay slope	Suited slope climate-frost	Suited slope climate-frost
Unaka	Unsuited depth to rock low clay	Unsuited depth to rock	Unsuited depth to rock low clay	Unsuited slope depth to rock	Unsuited slope depth to rock
PwD:					
Porters	Poorly suited slope climate-frost low clay	Suited slope	Suited slope low clay	Suited slope climate-frost	Poorly slope climate-frost
Unaka	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
PwE:					
Porters	Poorly suited slope climate-frost low clay	Suited slope	Poorly suited slope	Poorly suited slope climate-frost	Unsuited slope climate-frost
Unaka	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
PxF:					
Porters	Unsuited slope	Unsuited slope	Unsuited slope	Unsuited slope	Unsuited slope

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir*	Ball & burlap	Line-out** beds	Vegetables***
PxF:					
Unaka	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
RbA:					
Reddies	Unsuited flooding droughty climate-frost	Poorly suited flooding droughty low elevation	Poorly suited flooding too sandy	Suited flooding droughty climate-frost	Suited flooding droughty climate-frost
RcF:					
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Cataska	Unsuited slope depth to rock	Unsuited slope depth to rock warm aspect	Unsuited slope small stones depth to rock	Unsuited slope depth to rock small stones	Unsuited slope depth to rock small stones
RhD:					
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Chestoa	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
RhF:					
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Chestoa	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
RkF:					
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Cleveland	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
RoF:					
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Oteen	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
RpF:					
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Unicoi	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
RsA:					
Rosman	Unsuited flooding climate-frost low clay	Poorly suited flooding low elevation	Poorly suited flooding too sandy	Well suited flooding climate-frost	Well suited flooding climate-frost

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir*	Ball & burlap	Line-out** beds	Vegetables***
SoD:					
Soco	Poorly suited slope depth to rock low clay	Poorly suited slope depth to rock warm aspect	Poorly suited slope low clay depth to rock	Poorly suited slope depth to rock	Unsuited slope depth to rock
Stecoah	Poorly suited slope low clay	Poorly suited slope warm aspect	Suited slope low clay	Poorly suited slope	Poorly slope
SoE:					
Soco	Poorly suited slope depth to rock low clay	Poorly suited slope depth to rock warm aspect	Poorly suited slope low clay depth to rock	Poorly suited slope depth to rock	Unsuited slope depth to rock
Stecoah	Poorly suited slope low clay	Poorly suited slope warm aspect	Poorly suited slope low clay	Poorly suited slope	Unsuited slope
SoF:					
Soco	Unsuited slope depth to rock low clay	Unsuited slope depth to rock warm aspect	Unsuited slope low clay depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
Stecoah	Unsuited slope low clay	Unsuited slope warm aspect	Unsuited slope low clay	Unsuited slope	Unsuited slope
StB:					
Statler	Poorly suited climate-frost flooding	Poorly suited high clay phytophthora flooding	Poorly suited flooding	Poorly suited surface clay phytophthora flooding	Suited flooding climate-frost
SwD, SwE:					
Sylco	Unsuited slope depth to rock droughty	Unsuited slope depth to rock warm aspect	Unsuited slope small stones depth to rock	Unsuited slope depth to rock small stones	Unsuited slope depth to rock small stones
Cataska	Unsuited slope depth to rock low clay	Unsuited slope depth to rock warm aspect	Unsuited slope small stones depth to rock	Unsuited slope depth to rock small stones	Unsuited slope depth to rock small stones
SyD:					
Sylco	Unsuited slope depth to rock low clay	Unsuited slope depth to rock warm aspect	Unsuited slope small stones depth to rock	Unsuited slope depth to rock small stones	Unsuited slope depth to rock small stones
Soco	Poorly suited slope depth to rock low clay	Poorly suited slope depth to rock warm aspect	Poorly suited slope low clay depth to rock	Poorly suited slope depth to rock	Unsuited slope depth to rock

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir*	Ball & burlap	Line-out** beds	Vegetables***
SyE:					
Sylco	Unsuited slope depth to rock low clay	Unsuited slope depth to rock warm aspect	Unsuited slope small stones depth to rock	Unsuited slope depth to rock small stones	Unsuited slope depth to rock small stones
Soco	Poorly suited slope depth to rock low clay	Poorly suited slope depth to rock warm aspect	Poorly suited slope low clay depth to rock	Poorly suited slope depth to rock	Unsuited slope depth to rock
SzF:					
Sylco	Unsuited slope depth to rock low clay	Unsuited slope depth to rock warm aspect	Unsuited slope small stones depth to rock	Unsuited slope depth to rock small stones	Unsuited slope depth to rock small stones
Soco	Unsuited slope depth to rock low clay	Unsuited slope depth to rock warm aspect	Unsuited slope low clay depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
TaB:					
Tate	Suited climate-frost	Suited phytophthora low elevation	Well suited	Poorly suited surface clay phytophthora climate-frost	Well suited climate-frost
TaC:					
Tate	Suited climate-frost	Suited phytophthora low elevation	Suited slope	Poorly suited surface clay phytophthora slope climate-frost	Suited slope climate-frost
TaD:					
Tate	Suited slope climate-frost	Suited slope phytophthora low elevation	Suited slope	Poorly suited slope surface clay phytophthora climate-frost	Poorly slope climate-frost
TkC:					
Tate	Suited climate-frost large stones	Suited phytophthora large stones	Suited large stones slope	Poorly suited surface clay large stones slope climate-frost	Poorly large stones slope climate-frost
TkD:					
Tate	Suited slope climate-frost large stones	Suited slope phytophthora large stones	Suited slope large stones	Poorly suited slope surface clay large stones climate-frost	Poorly slope large stones climate-frost
TmC:					
Tate	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Urban land	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir*	Ball & burlap	Line-out** beds	Vegetables***
ToD, ToE:					
Toecane-----------------	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones
TrC:					
Toecane-----------------	Unsuited large stones	Unsuited large stones	Unsuited large stones	Unsuited large stones slope	Unsuited slope large stones
Tusquitee---------------	Suited large stones climate-frost	Suited large stones	Suited large stones slope	Suited large stones climate-frost	Suited slope large stones climate-frost
TsD, TsE:					
Toecane-----------------	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones
Tusquitee---------------	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones
TuD:					
Tusquitee---------------	Suited slope large stones climate-frost	Suited slope large stones	Suited slope large stones	Suited slope large stones climate-frost	Suited slope large stones climate-frost
Toecane-----------------	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones
TwB:					
Tusquitee---------------	Suited climate-frost	Well suited phytophthora	Well suited	Suited phytophthora climate-frost	Well suited climate-frost
Whiteside---------------	Suited climate-frost	Suited phytophthora	Well suited	Poorly suited phytophthora climate-frost	Well suited climate-frost
TwC:					
Tusquitee---------------	Suited climate-frost	Well suited phytophthora	Suited slope	Suited phytophthora climate-frost	Suited slope climate-frost
Whiteside---------------	Suited climate-frost	Suited phytophthora	Suited slope	Poorly suited phytophthora climate-frost	Suited slope climate-frost
UcB:					
Udifluvents-------------	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Aquents-----------------	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Ud:					
Udorthents--------------	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir*	Ball & burlap	Line-out** beds	Vegetables***
UfB, UhE:					
Udorthents	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Urban land	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
UkE:					
Unaka	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
UkF:					
Unaka	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
UrD:					
Unicoi	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
UsB:					
Unison	Suited climate-frost	Poorly suited high clay phytophthora	Poorly suited high clay	Poorly suited surface clay phytophthora	Well Suited climate-frost
UsC:					
Unison	Suited climate-frost	Poorly suited high clay phytophthora	Poorly suited high clay slope	Poorly suited surface clay phytophthora slope	Suited slope climate-frost
UsB:					
Unison	Suited slope climate-frost	Poorly suited slope high clay phytophthora	Poorly suited slope high clay	Unsuited slope surface clay phytophthora	Poorly suited slope climate-frost
W:					
Water	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
WaC2:					
Walnut	Poorly suited depth to rock eroded	Poorly suited depth to rock eroded	Poorly suited depth to rock eroded	Poorly suited depth to rock eroded slope	Poorly depth to rock eroded slope
Oteen	Unsuited depth to rock eroded	Unsuited depth to rock eroded	Unsuited depth to rock eroded	Unsuited depth to rock slope slope	Unsuited depth to rock slope slope
Mars Hill	Poorly suited low clay eroded	Poorly suited warm aspect eroded	Poorly suited low clay eroded slope	Poorly suited eroded slope	Poorly suited eroded slope

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir*	Ball & burlap	Line-out** beds	Vegetables***
WaD2:					
Walnut	Poorly suited slope depth to rock eroded	Poorly suited slope depth to rock eroded	Poorly suited slope depth to rock eroded	Poorly suited slope depth to rock eroded	Poorly suited slope depth to rock eroded
Oteen	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
Mars Hill	Suited slope low clay eroded	Poorly suited slope warm aspect eroded	Suited slope low clay eroded	Poorly suited slope eroded	Poorly suited slope eroded
WaE2:					
Walnut	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
Oteen	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
Mars Hill	Poorly suited slope low clay eroded	Poorly suited slope warm aspect eroded	Poorly suited slope low clay eroded	Poorly suited slope eroded	Unsuited slope eroded
WoF:					
Walnut	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
Oteen	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
WrC, WrD, WrE:					
Wayah	Unsuited slope climate	Unsuited slope climate	Unsuited slope climate	Unsuited slope climate	Unsuited slope climate
Burton	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate
WsF:					
Wayah	Unsuited slope climate	Unsuited slope climate	Unsuited slope climate	Unsuited slope climate	Unsuited slope climate
Burton	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir*	Ball & burlap	Line-out** beds	Vegetables***
WtB:					
Whiteside	Suited climate-frost	Suited phytophthora	Well suited	Poorly suited phytophthora climate-frost	Well suited climate-frost

* In general, elevations below 3,000 or above 4,600 feet are considered marginal to unsuited for the commercial production of Fraser fir due to climatic limitations.

** In general, elevations above 4,600 feet are considered marginal to unsuited for line-out beds.

*** Vegetables commonly include tomatoes, squash, bell peppers, sweet corn, cucumbers, pole/bush beans, potatoes, cabbage, greens, strawberries, and melons.

Table 6.—Non-Irrigated Yields by Map Unit Component for Crops and Pasture, Part I

(Yields are those that can be expected under a high level of management. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Map symbol and soil name	Land capability	Cabbage	Corn	Corn silage	Burley tobacco	Tomatoes
		Crates	Bu	Tons	Lbs	Tons
AcD:						
Ashe	6s	---	---	---	---	---
Cleveland	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
ArE:						
Ashe	7e	---	---	---	---	---
Cleveland	7e	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
ArF:						
Ashe	7s	---	---	---	---	---
Cleveland	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
BaA:						
Biltmore	3s	400.00	75.00	11.90	1,000.00	26.00
Toxaway	6w	---	---	---	---	---
BkB2:						
Braddock	2e	---	99.00	16.00	2,413.00	18.00
BkC2:						
Braddock	3e	---	89.00	14.00	2,173.00	---
BkD2:						
Braddock	4e	---	73.00	11.00	1,767.00	---
BnD:						
Buladean	4e	---	---	---	---	---
Chestnut	4e	---	---	---	---	---
BnE:						
Buladean	6e	---	---	---	---	---
Chestnut	6e	---	---	---	---	---
BnF:						
Buladean	7e	---	---	---	---	---
Chestnut	7e	---	---	---	---	---
CaD:						
Calvin	4e	---	---	---	---	---
CaE:						
Calvin	6e	---	---	---	---	---

Table 6.—Non-Irrigated Yields by Map Unit Component for Crops and Pasture, Part I—Continued

Map symbol and soil name	Land capability	Cabbage	Corn	Corn silage	Burley tobacco	Tomatoes
		Crates	Bu	Tons	Lbs	Tons
CaF:						
Calvin	7e	---	---	---	---	---
CfF:						
Cataska	7s	---	---	---	---	---
Sylco	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
ChD:						
Cheoah	6e	---	---	---	---	---
Jeffrey	6e	---	---	---	---	---
ChE:						
Cheoah	7e	---	---	---	---	---
Jeffrey	7e	---	---	---	---	---
ChF:						
Cheoah	7e	---	---	---	---	---
Jeffrey	7e	---	---	---	---	---
CsD:						
Chestoa	6e	---	---	---	---	---
CsE:						
Chestoa	6e	---	---	---	---	---
CsF:						
Chestoa	7e	---	---	---	---	---
CtB2:						
Clifton	2e	---	109.00	17.10	2,660.00	---
CtC2:						
Clifton	3e	---	92.00	14.40	2,240.00	---
CtD2:						
Clifton	4e	---	81.00	12.60	1,960.00	---
CtE2:						
Clifton	6e	---	---	---	---	---
CxC:						
Clifton	3e	---	---	---	---	---
Urban land	8s	---	---	---	---	---
DeA:						
Dellwood	3s	---	98.00	16.00	1,766.00	22.00
Reddies	2w	450.00	203.00	32.00	2,576.00	26.00
Ela	6w	---	---	---	---	---
DrB:						
Dillard	2w	500.00	171.00	27.00	2,538.00	28.00
Hemphill	6w	---	---	---	---	---

Table 6.—Non-Irrigated Yields by Map Unit Component for Crops and Pasture, Part I—Continued

Map symbol and soil name	Land capability	Cabbage	Corn	Corn silage	Burley tobacco	Tomatoes
		Crates	Bu	Tons	Lbs	Tons
DtD:						
Ditney	7s	---	---	---	---	---
Unicoi	7s	---	---	---	---	---
DuE:						
Ditney	7s	---	---	---	---	---
Unicoi	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
DuF:						
Ditney	7s	---	---	---	---	---
Unicoi	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
EdD:						
Edneyville	4e	---	---	---	---	---
Chestnut	4e	---	---	---	---	---
EdE:						
Edneyville	6e	---	---	---	---	---
Chestnut	6e	---	---	---	---	---
EdF:						
Edneyville	7e	---	---	---	---	---
Chestnut	7e	---	---	---	---	---
EfA:						
Ela, drained	6w	---	---	---	---	---
Ela, undrained	4w	---	70.00	11.00	1,000.00	---
EvD2:						
Evard	4e	---	86.00	14.00	2,041.00	---
Cowee	4e	---	77.00	13.00	1,837.00	---
EvE2:						
Evard	6e	---	---	---	---	---
Cowee	6e	---	---	---	---	---
EvF2:						
Evard	7e	---	---	---	---	---
Cowee	7e	---	---	---	---	---
EwD:						
Evard	4e	---	86.00	14.00	2,041.00	---
Cowee	4e	---	77.00	13.00	1,837.00	---

Table 6.—Non-Irrigated Yields by Map Unit Component for Crops and Pasture, Part I—Continued

Map symbol and soil name	Land capability	Cabbage	Corn	Corn silage	Burley tobacco	Tomatoes
		Crates	Bu	Tons	Lbs	Tons
EwE:						
Evard	6e	---	---	---	---	---
Cowee	6e	---	---	---	---	---
EwF:						
Evard	7e	---	---	---	---	---
Cowee	7e	---	---	---	---	---
FnD2:						
Fannin	4e	---	47.00	9.00	1,256.00	---
FrA:						
French	3w	---	155.00	24.00	2,200.00	---
Ela	6w	---	---	---	---	---
HcE:						
Heintooga	7s	---	---	---	---	---
Chiltoskie	7s	---	---	---	---	---
HpA:						
Hemphill, drained	3w	---	105.00	16.00	1,000.00	---
Hemphill, undrained	6w	---	---	---	---	---
JbD:						
Junaluska	4e	---	55.00	8.20	1,095.00	---
Brasstown	4e	---	67.00	10.00	1,335.00	---
JbE:						
Junaluska	6e	---	---	---	---	---
Brasstown	6e	---	---	---	---	---
JbF:						
Junaluska	7e	---	---	---	---	---
Brasstown	7e	---	---	---	---	---
KnC:						
Keener	3e	---	112.00	20.00	1,920.00	---
MwC:						
Mars Hill	3e	---	---	---	---	---
Walnut	3e	---	---	---	---	---
MwD:						
Mars Hill	4e	---	---	---	---	---
Walnut	4e	---	---	---	---	---
MwE:						
Mars Hill	6e	---	---	---	---	---
Walnut	6e	---	---	---	---	---

Table 6.—Non-Irrigated Yields by Map Unit Component for Crops and Pasture, Part I—Continued

Map symbol and soil name	Land capability	Cabbage	Corn	Corn silage	Burley tobacco	Tomatoes
		Crates	Bu	Tons	Lbs	Tons
MwF:						
Mars Hill	7e	---	---	---	---	---
Walnut	7e	---	---	---	---	---
MyB:						
Maymead	3e	---	---	---	---	---
Northcove	7s	---	---	---	---	---
NhC:						
Northcove	7s	---	---	---	---	---
Maymead	3e	---	---	---	---	---
NtD:						
Northcove	7s	---	---	---	---	---
Maymead	4s	---	---	---	---	---
NtE:						
Northcove	7s	---	---	---	---	---
Maymead	6e	---	---	---	---	---
OwC:						
Oconaluftee	4c	---	---	---	---	---
Guyot	4c	---	---	---	---	---
Cataloochee	4c	---	---	---	---	---
OwD:						
Oconaluftee	6c	---	---	---	---	---
Guyot	6c	---	---	---	---	---
Cataloochee	6c	---	---	---	---	---
OwE:						
Oconaluftee	6e	---	---	---	---	---
Guyot	6e	---	---	---	---	---
Cataloochee	6e	---	---	---	---	---
OwF:						
Oconaluftee	7e	---	---	---	---	---
Guyot	7e	---	---	---	---	---
Cataloochee	7e	---	---	---	---	---
PwC:						
Porters	3e	---	96.00	19.20	1,280.00	---
Unaka	3e	---	---	---	---	---
PwD:						
Porters	4e	---	84.00	16.80	1,120.00	---
Unaka	6e	---	84.00	16.80	1,120.00	---

Table 6.—Non-Irrigated Yields by Map Unit Component for Crops and Pasture, Part I—Continued

Map symbol and soil name	Land capability	Cabbage	Corn	Corn silage	Burley tobacco	Tomatoes
		Crates	Bu	Tons	Lbs	Tons
PwE:						
Porters	6e	---	---	---	---	---
Unaka	6e	---	---	---	---	---
PxF:						
Porters	7e	---	---	---	---	---
Unaka	7e	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
RbA:						
Reddies	2w	450.00	203.00	32.00	2,576.00	26.00
Ela	6w	---	---	---	---	---
RcF:						
Rock outcrop	8s	---	---	---	---	---
Cataska	7s	---	---	---	---	---
RhD:						
Rock outcrop	8s	---	---	---	---	---
Chestoa	7e	---	---	---	---	---
RhF:						
Rock outcrop	8s	---	---	---	---	---
Chestoa	7e	---	---	---	---	---
RkF:						
Rock outcrop	8s	---	---	---	---	---
Cleveland	7s	---	---	---	---	---
RoF:						
Rock outcrop	8s	---	---	---	---	---
Oteen	7e	---	---	---	---	---
RpF:						
Rock outcrop	8s	---	---	---	---	---
Unicoi	7s	---	---	---	---	---
RsA:						
Rosman	2w	450.00	2.50	32.00	2,600.00	30.00
Toxaway	6w	---	---	---	---	---
SoD:						
Soco	4e	---	---	---	---	---
Stecoah	4e	---	---	---	---	---
SoE:						
Soco	6e	---	---	---	---	---
Stecoah	6e	---	---	---	---	---

Table 6.—Non-Irrigated Yields by Map Unit Component for Crops and Pasture, Part I—Continued

Map symbol and soil name	Land capability	Cabbage	Corn	Corn silage	Burley tobacco	Tomatoes
		Crates	Bu	Tons	Lbs	Tons
SoF:						
Soco	7e	---	---	---	---	---
Stecoah	7e	---	---	---	---	---
StB:						
Statler	2e	400.00	200.00	31.00	2,733.00	30.00
Hemphill	6w	---	---	---	---	---
SwD:						
Sylco	7s	---	---	---	---	---
Cataska	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
SwE:						
Sylco	7s	---	---	---	---	---
Cataska	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
SyD:						
Sylco	7s	---	---	---	---	---
Soco	4e	---	---	---	---	---
SyE:						
Sylco	7s	---	---	---	---	---
Soco	7e	---	---	---	---	---
SzF:						
Sylco	7s	---	---	---	---	---
Soco	7e	---	---	---	---	---
TaB:						
Tate	2e	---	133.00	23.80	2,280.00	26.00
TaC:						
Tate	3e	---	112.00	20.00	1,920.00	---
TaD:						
Tate	4e	---	98.00	17.50	1,680.00	---
TkC:						
Tate	4s	---	---	---	---	---
TkD:						
Tate	4s	---	---	---	---	---
TmC:						
Tate	3e	---	---	---	---	---
Urban land	8s	---	---	---	---	---
ToD:						
Toecane	7s	---	---	---	---	---

Table 6.—Non-Irrigated Yields by Map Unit Component for Crops and Pasture, Part I—Continued

Map symbol and soil name	Land capability	Cabbage	Corn	Corn silage	Burley tobacco	Tomatoes
		Crates	Bu	Tons	Lbs	Tons
ToE:						
Toecane	7s	---	---	---	---	---
TrC:						
Toecane	7s	---	---	---	---	---
Tusquitee	3e	---	---	---	---	---
TsD:						
Toecane	7s	---	---	---	---	---
Tusquitee	6s	---	---	---	---	---
TsE:						
Toecane	7s	---	---	---	---	---
Tusquitee	7s	---	---	---	---	---
TuD:						
Tusquitee	4e	---	112.00	19.60	1,680.00	---
Toecane	7s	---	---	---	---	---
TwB:						
Tusquitee	2e	---	158.00	26.60	2,345.00	---
Whiteside	2e	---	166.00	26.60	2,470.00	---
Sylva	6w	---	---	---	---	---
TwC:						
Tusquitee	3e	475.00	133.00	22.40	1,986.00	---
Whiteside	3e	---	166.00	26.60	2,470.00	---
Sylva	3w	---	---	---	---	---
UcB:						
Udifluvents	6s	---	---	---	---	---
Aquents	6w	---	---	---	---	---
Ud:						
Udorthents	7e	---	---	---	---	---
UfB:						
Udorthents	7s	---	---	---	---	---
Urban land	8s	---	---	---	---	---
UhE:						
Udorthents	7s	---	---	---	---	---
Urban land	8s	---	---	---	---	---
UkE:						
Unaka	7e	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---

Table 6.—Non-Irrigated Yields by Map Unit Component for Crops and Pasture, Part I—Continued

Map symbol and soil name	Land capability	Cabbage	Corn	Corn silage	Burley tobacco	Tomatoes
		Crates	Bu	Tons	Lbs	Tons
UkF:						
Unaka	7e	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
UrD:						
Unicoi	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
UsB:						
Unison	2e	---	128.00	23.80	2,660.00	---
UsC:						
Unison	3e	---	108.00	20.00	2,240.00	---
UsD:						
Unison	4e	---	95.00	17.50	1,960.00	---
W:						
Water	8w	---	---	---	---	---
WaC2:						
Walnut	4e	---	---	---	---	---
Oteen	4e	---	---	---	---	---
Mars Hill	3e	---	---	---	---	---
WaD2:						
Walnut	4e	---	---	---	---	---
Oteen	6e	---	---	---	---	---
Mars Hill	4e	---	---	---	---	---
WaE2:						
Walnut	7e	---	---	---	---	---
Oteen	7e	---	---	---	---	---
Mars Hill	7e	---	---	---	---	---
WoF:						
Walnut	7e	---	---	---	---	---
Oteen	7e	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
WrC:						
Wayah	4c	---	---	---	---	---
Burton	4c	---	---	---	---	---
WrD:						
Wayah	6c	---	---	---	---	---
Burton	6c	---	---	---	---	---

Table 6.—Non-Irrigated Yields by Map Unit Component for Crops and Pasture, Part I—Continued

Map symbol and soil name	Land capability	Cabbage	Corn	Corn silage	Burley tobacco	Tomatoes
		Crates	Bu	Tons	Lbs	Tons
WrE:						
Wayah	7e	---	---	---	---	---
Burton	7e	---	---	---	---	---
WsF:						
Wayah	7e	---	---	---	---	---
Burton	7e	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
WtB:						
Whiteside	2e	475.00	166.00	26.60	2,470.00	---
Sylva	6w	---	---	---	---	---

Table 6.—Non-Irrigated Yields by Map Unit Component for Crops and Pasture, Part II

(Yields are those that can be expected under a high level of management. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Map symbol and soil name	Land capability	Alfalfa hay	Cool-season grasses	Orchardgrass hay	Tall fescue hay	Timothy hay
		Tons	Tons	Tons	Tons	Tons
AcD:						
Ashe	6s	---	---	---	---	---
Cleveland	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
ArE:						
Ashe	7e	---	---	---	---	---
Cleveland	7e	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
ArF:						
Ashe	7s	---	---	---	---	---
Cleveland	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
BaA:						
Biltmore	3s	---	1.40	1.80	2.00	1.60
Toxaway	6w	---	---	---	---	---
BkB2:						
Braddock	2e	6.00	3.60	4.70	5.20	4.10
BkC2:						
Braddock	3e	5.50	3.30	4.20	4.70	3.70
BkD2:						
Braddock	4e	---	2.60	3.40	3.80	3.00
BnD:						
Buladean	4e	---	---	---	---	---
Chestnut	4e	---	---	---	---	---
BnE:						
Buladean	6e	---	---	---	---	---
Chestnut	6e	---	---	---	---	---
BnF:						
Buladean	7e	---	---	---	---	---
Chestnut	7e	---	---	---	---	---
CaD:						
Calvin	4e	---	---	---	---	---
CaE:						
Calvin	6e	---	---	---	---	---

Table 6.—Non-Irrigated Yields by Map Unit Component for Crops and Pasture, Part II—Continued

Map symbol and soil name	Land capability	Alfalfa hay	Cool-season grasses	Orchardgrass hay	Tall fescue hay	Timothy hay
		Tons	Tons	Tons	Tons	Tons
CaF:						
Calvin	7e	---	---	---	---	---
CfF:						
Cataska	7s	---	---	---	---	---
Sylco	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
ChD:						
Cheoah	6e	---	---	---	---	---
Jeffrey	6e	---	---	---	---	---
ChE:						
Cheoah	7e	---	---	---	---	---
Jeffrey	7e	---	---	---	---	---
ChF:						
Cheoah	7e	---	---	---	---	---
Jeffrey	7e	---	---	---	---	---
CsD:						
Chestoa	6e	---	---	---	---	---
CsE:						
Chestoa	6e	---	---	---	---	---
CsF:						
Chestoa	7e	---	---	---	---	---
CtB2:						
Clifton	2e	---	4.00	5.10	5.70	4.60
CtC2:						
Clifton	3e	---	3.40	4.30	4.80	3.80
CtD2:						
Clifton	4e	---	2.90	3.80	4.20	3.40
CtE2:						
Clifton	6e	---	2.90	3.80	4.20	3.40
CxC:						
Clifton	3e	---	---	---	---	---
Urban land	8s	---	---	---	---	---
DeA:						
Dellwood	3s	---	2.70	3.50	3.90	3.10
Reddies	2w	4.50	3.50	4.50	5.00	4.00
Ela	6w	---	---	---	---	---
DrB:						
Dillard	2w	4.50	3.80	4.90	5.40	4.30
Hemphill	6w	---	---	---	---	---

Table 6.—Non-Irrigated Yields by Map Unit Component for Crops and Pasture, Part II—Continued

Map symbol and soil name	Land capability	Alfalfa hay	Cool-season grasses	Orchardgrass hay	Tall fescue hay	Timothy hay
		Tons	Tons	Tons	Tons	Tons
DtD:						
Ditney	7s	---	---	---	---	---
Unicoi	7s	---	---	---	---	---
DuE:						
Ditney	7s	---	---	---	---	---
Unicoi	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
DuF:						
Ditney	7s	---	---	---	---	---
Unicoi	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
EdD:						
Edneyville	4e	---	2.50	3.20	3.50	2.80
Chestnut	4e	---	2.30	2.90	3.20	2.50
EdE:						
Edneyville	6e	---	2.00	2.50	2.80	2.20
Chestnut	6e	---	1.80	2.30	2.50	2.00
EdF:						
Edneyville	7e	---	---	---	---	---
Chestnut	7e	---	---	---	---	---
EfA:						
Ela, drained	6w	---	---	---	---	---
Ela, undrained	4w	---	2.10	2.70	3.00	2.40
EvD2:						
Evard	4e	---	2.50	3.20	3.50	2.80
Cowee	4e	---	2.30	2.90	3.20	2.50
EvE2:						
Evard	6e	---	2.00	2.50	2.80	2.20
Cowee	6e	---	1.80	2.30	2.50	2.00
EvF2:						
Evard	7e	---	---	---	---	---
Cowee	7e	---	---	---	---	---
EwD:						
Evard	4e	---	2.50	3.20	3.50	2.80
Cowee	4e	---	2.30	2.90	3.20	2.50

Table 6.—Non-Irrigated Yields by Map Unit Component for Crops and Pasture, Part II—Continued

Map symbol and soil name	Land capability	Alfalfa hay	Cool-season grasses	Orchardgrass hay	Tall fescue hay	Timothy hay
		Tons	Tons	Tons	Tons	Tons
EwE:						
Evard	6e	---	2.00	2.50	2.80	2.20
Cowee	6e	---	1.80	2.30	2.50	2.00
EwF:						
Evard	7e	---	---	---	---	---
Cowee	7e	---	---	---	---	---
FnD2:						
Fannin	4e	---	1.40	1.80	2.00	1.60
FrA:						
French	3w	---	2.80	3.60	4.00	3.20
Ela	6w	---	---	---	---	---
HcE:						
Heintooga	7s	---	---	---	---	---
Chiltoskie	7s	---	---	---	---	---
HpA:						
Hemphill, drained	3w	---	1.40	1.80	2.00	1.60
Hemphill, undrained	6w	---	---	---	---	---
JbD:						
Junaluska	4e	---	2.10	2.60	2.90	2.30
Brasstown	4e	---	2.50	3.20	3.50	2.80
JbE:						
Junaluska	6e	---	1.60	2.10	2.30	1.80
Brasstown	6e	---	2.00	2.50	2.80	2.20
JbF:						
Junaluska	7e	---	---	---	---	---
Brasstown	7e	---	---	---	---	---
KnC:						
Keener	3e	---	3.40	4.30	4.80	3.80
MwC:						
Mars Hill	3e	---	---	---	---	---
Walnut	3e	---	---	---	---	---
MwD:						
Mars Hill	4e	---	---	---	---	---
Walnut	4e	---	---	---	---	---
MwE:						
Mars Hill	6e	---	---	---	---	---
Walnut	6e	---	---	---	---	---

Table 6.—Non-Irrigated Yields by Map Unit Component for Crops and Pasture, Part II—Continued

Map symbol and soil name	Land capability	Alfalfa hay	Cool-season grasses	Orchardgrass hay	Tall fescue hay	Timothy hay
		Tons	Tons	Tons	Tons	Tons
MwF:						
Mars Hill	7e	---	---	---	---	---
Walnut	7e	---	---	---	---	---
MyB:						
Maymead	3e	---	---	---	---	---
Northcove	7s	---	---	---	---	---
NhC:						
Northcove	7s	---	---	---	---	---
Maymead	3e	---	---	---	---	---
NtD:						
Northcove	7s	---	---	---	---	---
Maymead	4s	---	---	---	---	---
NtE:						
Northcove	7s	---	---	---	---	---
Maymead	6e	---	---	---	---	---
OwC:						
Oconaluftee	4c	---	---	---	---	---
Guyot	4c	---	---	---	---	---
Cataloochee	4c	---	---	---	---	---
OwD:						
Oconaluftee	6c	---	---	---	---	---
Guyot	6c	---	---	---	---	---
Cataloochee	6c	---	---	---	---	---
OwE:						
Oconaluftee	6e	---	---	---	---	---
Guyot	6e	---	---	---	---	---
Cataloochee	6e	---	---	---	---	---
OwF:						
Oconaluftee	7e	---	---	---	---	---
Guyot	7e	---	---	---	---	---
Cataloochee	7e	---	---	---	---	---
PwC:						
Porters	3e	---	2.20	2.90	3.20	2.60
Unaka	3e	---	---	---	---	---
PwD:						
Porters	4e	---	2.00	2.50	2.80	2.20
Unaka	6e	---	2.00	2.50	2.80	2.20

Table 6.—Non-Irrigated Yields by Map Unit Component for Crops and Pasture, Part II—Continued

Map symbol and soil name	Land capability	Alfalfa hay	Cool-season grasses	Orchardgrass hay	Tall fescue hay	Timothy hay
		Tons	Tons	Tons	Tons	Tons
PwE:						
Porters	6e	---	2.00	2.50	2.80	2.20
Unaka	6e	---	2.00	2.50	2.80	2.20
PxF:						
Porters	7e	---	---	---	---	---
Unaka	7e	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
RbA:						
Reddies	2w	4.50	3.50	4.50	5.00	4.00
Ela	6w	---	---	---	---	---
RcF:						
Rock outcrop	8s	---	---	---	---	---
Cataska	7s	---	---	---	---	---
RhD:						
Rock outcrop	8s	---	---	---	---	---
Chestoa	7e	---	---	---	---	---
RhF:						
Rock outcrop	8s	---	---	---	---	---
Chestoa	7e	---	---	---	---	---
RkF:						
Rock outcrop	8s	---	---	---	---	---
Cleveland	7s	---	---	---	---	---
RoF:						
Rock outcrop	8s	---	---	---	---	---
Oteen	7e	---	---	---	---	---
RpF:						
Rock outcrop	8s	---	---	---	---	---
Unicoi	7s	---	---	---	---	---
RsA:						
Rosman	2w	4.50	3.50	4.50	5.00	4.00
Toxaway	6w	---	---	---	---	---
SoD:						
Soco	4e	---	---	---	---	---
Stecoah	4e	---	---	---	---	---
SoE:						
Soco	6e	---	---	---	---	---
Stecoah	6e	---	---	---	---	---

Table 6.—Non-Irrigated Yields by Map Unit Component for Crops and Pasture, Part II—Continued

Map symbol and soil name	Land capability	Alfalfa hay	Cool-season grasses	Orchardgrass hay	Tall fescue hay	Timothy hay
		Tons	Tons	Tons	Tons	Tons
SoF:						
Soco	7e	---	---	---	---	---
Stecoah	7e	---	---	---	---	---
StB:						
Statler	2e	6.50	3.40	4.40	4.90	3.90
Hemphill	6w	---	---	---	---	---
SwD:						
Sylco	7s	---	---	---	---	---
Cataska	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
SwE:						
Sylco	7s	---	---	---	---	---
Cataska	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
SyD:						
Sylco	7s	---	---	---	---	---
Soco	4e	---	---	---	---	---
SyE:						
Sylco	7s	---	---	---	---	---
Soco	7e	---	---	---	---	---
SzF:						
Sylco	7s	---	---	---	---	---
Soco	7e	---	---	---	---	---
TaB:						
Tate	2e	6.00	4.00	5.10	5.70	4.60
TaC:						
Tate	3e	5.50	3.40	4.30	4.80	3.80
TaD:						
Tate	4e	---	2.90	3.80	4.20	3.40
TkC:						
Tate	4s	---	3.40	4.30	4.80	3.80
TkD:						
Tate	4s	---	2.90	3.80	4.20	3.40
TmC:						
Tate	3e	---	---	---	---	---
Urban land	8s	---	---	---	---	---
ToD:						
Toecane	7s	---	---	---	---	---

Table 6.—Non-Irrigated Yields by Map Unit Component for Crops and Pasture, Part II—Continued

Map symbol and soil name	Land capability	Alfalfa hay	Cool-season grasses	Orchardgrass hay	Tall fescue hay	Timothy hay
		Tons	Tons	Tons	Tons	Tons
ToE:						
Toecane	7s	---	---	---	---	---
TrC:						
Toecane	7s	---	3.40	4.30	4.80	3.80
Tusquitee	3e	---	3.30	4.20	4.60	3.70
TsD:						
Toecane	7s	---	2.90	3.80	4.20	3.40
Tusquitee	6s	---	2.90	3.80	4.20	3.40
TsE:						
Toecane	7s	---	---	---	---	---
Tusquitee	7s	---	---	---	---	---
TuD:						
Tusquitee	4e	---	2.90	3.80	4.20	3.40
Toecane	7s	---	---	---	---	---
TwB:						
Tusquitee	2e	---	3.90	5.00	5.50	4.40
Whiteside	2e	---	3.70	4.80	5.20	4.20
Sylva	6w	---	---	---	---	---
TwC:						
Tusquitee	3e	---	3.30	4.20	4.60	3.70
Whiteside	3e	---	3.70	4.80	5.20	4.20
Sylva	3w	---	---	---	---	---
UcB:						
Udifluvents	6s	---	---	---	---	---
Aquents	6w	---	---	---	---	---
Ud:						
Udorthents	7e	---	---	---	---	---
UfB:						
Udorthents	7s	---	---	---	---	---
Urban land	8s	---	---	---	---	---
UhE:						
Udorthents	7s	---	---	---	---	---
Urban land	8s	---	---	---	---	---
UkE:						
Unaka	7e	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---

Table 6.—Non-Irrigated Yields by Map Unit Component for Crops and Pasture, Part II—Continued

Map symbol and soil name	Land capability	Alfalfa hay	Cool-season grasses	Orchardgrass hay	Tall fescue hay	Timothy hay
		Tons	Tons	Tons	Tons	Tons
UkF:						
Unaka	7e	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
UrD:						
Unicoi	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
UsB:						
Unison	2e	6.00	3.30	4.30	4.80	3.80
UsC:						
Unison	3e	5.50	2.80	3.60	4.00	3.20
UsD:						
Unison	4e	5.00	2.50	3.20	3.50	2.80
W:						
Water	8w	---	---	---	---	---
WaC2:						
Walnut	4e	---	---	---	---	---
Oteen	4e	---	---	---	---	---
Mars Hill	3e	---	---	---	---	---
WaD2:						
Walnut	4e	---	---	---	---	---
Oteen	6e	---	---	---	---	---
Mars Hill	4e	---	---	---	---	---
WaE2:						
Walnut	7e	---	---	---	---	---
Oteen	7e	---	---	---	---	---
Mars Hill	7e	---	---	---	---	---
WoF:						
Walnut	7e	---	---	---	---	---
Oteen	7e	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
WrC:						
Wayah	4c	---	---	---	---	---
Burton	4c	---	---	---	---	---
WrD:						
Wayah	6c	---	---	---	---	---
Burton	6c	---	---	---	---	---

Table 6.—Non-Irrigated Yields by Map Unit Component for Crops and Pasture, Part II—Continued

Map symbol and soil name	Land capability	Alfalfa hay	Cool-season grasses	Orchardgrass hay	Tall fescue hay	Timothy hay
		Tons	Tons	Tons	Tons	Tons
WrE:						
Wayah	7e	---	---	---	---	---
Burton	7e	---	---	---	---	---
WsF:						
Wayah	7e	---	---	---	---	---
Burton	7e	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
WtB:						
Whiteside	2e	---	3.70	4.80	5.20	4.20
Sylva	6w	---	---	---	---	---

Table 7.—Prime Farmalnd

(Only the soils considered prime are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Map unit name
BaA	Biltmore loamy sand, 0 to 3 percent slopes, occasionally flooded (if irrigated and either protected from flooding or not frequently flooded during the growing season)
BkB2	Braddock clay loam, 2 to 8 percent slopes, moderately eroded
CtB2	Clifton clay loam, 2 to 8 percent slopes, moderately eroded
DrB	Dillard loam, 1 to 5 percent slopes, rarely flooded
FrA	French loam, 0 to 3 percent slopes, occasionally flooded (if drained)
RbA	Reddies sandy loam, 0 to 3 percent slopes, occasionally flooded
RsA	Rosman fine sandy loam, 0 to 3 percent slopes, occasionally flooded
StB	Statler loam, 1 to 5 percent slopes, rarely flooded
TaB	Tate loam, 2 to 8 percent slopes
TwB	Tusquitee-Whiteside complex, 2 to 8 percent slopes
UsB	Unison loam, 2 to 8 percent slopes
WtB	Whiteside loam, 2 to 8 percent slopes

Table 8.—Farmland of Statewide Importance

(Only the soils important farmland are listed. Urban or built-up areas of the soils listed are not considered important farmland. The following map units do not quite meet the requirements for prime farmland, but are considered farmland of statewide importance)

Map symbol	Map unit name
BkC2	Braddock clay loam, 8 to 15 percent slopes, moderately eroded
CtC2	Clifton clay loam, 8 to 15 percent slopes, moderately eroded
DeA	Dellwood-Reddies complex, 0 to 3 percent slopes occasionally flooded
HpA	Hemphill clay loam, 0 to 3 percent slopes, rarely flooded
TaC	Tate loam, 8 to 15 percent slopes
TwC	Tusquitee-Whiteside complex, 8 to 15 percent slopes
UsC	Unison loam, 8 to 15 percent slopes
WaC2	Walnut-Oteen-Mars hill complex, 8 to 15 percent slopes, moderately eroded

Table 9.—Farmland of Local Importance

(This farmland is land that was previously cleared and is currently in pasture or hayland production, orchards and vineyards, seed beds and lineout beds for ornamental crop production, and Christmas tree production. Most require a more hands-on approach to production, less mechanization, and less ground-disturbing activities than typical row crop production. The costs of production are considered acceptable by the producer and the agricultural community. The very stony units are dominantly pasture. The following map units do not quite meet the requirements for prime or statewide farmland, but are considered farmland of local importance)

Map Symbol	Map unit name
AcD	Ashe-Cleveland-Rock outcrop complex, 15 to 30 percent slopes, very stony
BkD2	Braddock clay loam, 15 to 30 percent slopes, moderately eroded
BnD	Buladean-Chestnut complex, 15 to 30 percent slopes, stony
CaD	Calvin channery silt loam, 15 to 30 percent slopes
CtD2	Clifton clay loam, 15 to 30 percent slopes, moderately eroded
EdD	Edneyville-Chestnut complex, 15 to 30 percent slopes, stony
EvD2	Evard-Cowee complex, 15 to 30 percent slopes, moderately eroded
EwD	Evard-Cowee complex, 15 to 30 percent slopes, stony
FnD2	Fannin sandy clay loam, 15 to 30 percent slopes, moderately eroded
JbD	Junaluska-Brasstown complex, 15 to 30 percent slopes
KnC	Keener loam, 8 to 15 percent slopes, stony
MwC	Mars Hill-Walnut complex, 8 to 15 percent slopes, stony
MwD	Mars Hill-Walnut complex, 15 to 30 percent slopes, stony
MyB	Maymead-Northcove complex, 2 to 8 percent slopes, stony
NhC	Northcove-Maymead complex, 8 to 15 percent slopes, stony
NtD	Northcove-Maymead complex, 15 to 30 percent slopes, very stony
PwC	Porters-Unaka complex, 8 to 15 percent slopes, stony
PwD	Porters-Unaka complex, 15 to 30 percent slopes, stony
SoD	Soco-Stecoah complex, 15 to 30 percent slopes, stony
SyD	Sylco-Soco complex, 15 to 30 percent slopes, stony
TaD	Tate loam, 15 to 30 percent slopes
TkC	Tate loam, 8 to 15 percent slopes, very stony
TkD	Tate loam, 15 to 30 percent slopes, very stony
TuD	Tusquitee-Toecane complex, 15 to 30 percent slopes, stony
UsD	Unison loam, 15 to 30 percent slopes
WaD2	Walnut-Oteen-Mars Hill complex, 15 to 30 percent slopes, moderately eroded

Table 10.—Hydric Soils

(This report lists only those map unit components that are rated as hydric. Definitions of hydric criteria codes are included at the end of the report)

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
BaA: Biltmore loamy sand, 0 to 3 percent slopes, occasionally flooded	Toxaway, undrained	5	Depressions, flood plains	Yes	2B3
DeA: Dellwood-Reddies complex, 0 to 3 percent slopes, occasionally flooded	Ela, undrained	5	Depressions, flood plains	Yes	2B3
DrB: Dillard loam, 1 to 5 percent slopes, rarely flooded	Hemphill, drained	5	Depressions, stream terraces	Yes	2B3
EfA: Ela loam, 0 to 2 percent slopes, frequently flooded	Ela, drained	65	Depressions, flood plains	Yes	2B3
	Ela, undrained	10	Depressions, flood plains	Yes	2B3
FrA: French loam, 0 to 3 percent slopes, occasionally flooded	Ela, undrained	5	Depressions, flood plains	Yes	2B3
HpA: Hemphill clay loam, 0 to 3 percent slopes, rarely flooded	Hemphill, drained	80	Depressions, stream terraces	Yes	2B3
	Hemphill, undrained	5	Depressions, stream terraces	Yes	2B3
RbA: Reddies sandy loam, 0 to 3 percent slopes, occasionally flooded	Ela, undrained	5	Depressions, flood plains	Yes	2B3
RsA: Rosman fine sandy loam, 0 to 3 percent slopes, occasionally flooded	Toxaway, undrained	5	Depressions, flood plains	Yes	2B3
StB: Statler loam, 1 to 5 percent slopes, rarely flooded	Hemphill, drained	5	Depressions, stream terraces	Yes	2B3
TwB: Tusquitee-Whiteside complex, 2 to 8 percent slopes	Sylva, undrained	5	Depressions, drainageways	Yes	2B3
TwC: Tusquitee-Whiteside complex, 8 to 15 percent slopes	Sylva, undrained	5	Depressions, drainageways	Yes	2B3
UcB: Udifluvents, sandy, 0 to 5 percent slopes, frequently flooded	Aquents	5	Depressions, flood plains	Yes	2B3

Table 10.—Hydric Soils—Continued

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
WtB:					
Whiteside loam, 2 to 8 percent slopes	Sylva, undrained	5	Coves, depressions, drainageways	Yes	2B3

Explanation of hydric criteria codes:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
   - A. are somewhat poorly drained and have a water table at the surface (0.0 feet) during the growing season, or
   - B. are poorly drained or very poorly drained and have either:
     - 1.) a water table at the surface (0.0 feet) during the growing season if textures are coarse sand, sand, or fine sand in all layers within a depth of 20 inches, or
     - 2.) a water table at a depth of 0.5 foot or less during the growing season if permeability is equal to or greater than 6.0 in/hr in all layers within a depth of 20 inches, or
     - 3.) a water table at a depth of 1.0 foot or less during the growing season if permeability is less than 6.0 in/hr in any layer within a depth of 20 inches.
3. Soils that are frequently ponded for long or very long duration during the growing season.
4. Soils that are frequently flooded for long or very long duration during the growing season.

Table 11.—Woodland Management and Productivity

(Please refer to the "Detailed Soil Map Units" section and the "Woodland Management and Productivity" section of this soil survey for information on soil properties and management concerns. Forestland managers should seek technical assistance from a professional forester. See footnotes at end of table)

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
AcD:									
Ashe	---	---	---	---	---	chestnut oak	70	52.00	See footnote 4.
						eastern white pine	81	146.00	
						hickory	---	---	
						Virginia pine	---	---	
						pitch pine	---	---	
						scarlet oak	---	---	
Cleveland	---	---	---	---	---	chestnut oak	---	---	See footnote 4.
						eastern white pine	---	---	
						scarlet oak	---	---	
						white oak	---	---	
						black oak	---	---	
						shortleaf pine	---	---	
						pitch pine	---	---	
Rock outcrop.									
ArE:									
Ashe	---	---	---	---	---	chestnut oak	70	52.00	See footnote 4.
						eastern white pine	81	146.00	
						hickory	---	---	
						Virginia pine	---	---	
						pitch pine	---	---	
						scarlet oak	---	---	
Cleveland	---	---	---	---	---	chestnut oak	---	---	See footnote 4.
						eastern white pine	---	---	
						scarlet oak	---	---	
						white oak	---	---	
						black oak	---	---	
						shortleaf pine	---	---	
						pitch pine	---	---	
Rock outcrop.									

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
ArF:									
Ashe	---	---	---	---	---	chestnut oak	70	52.00	See footnote 4.
						eastern white pine	81	146.00	
						hickory	---	---	
						Virginia pine	---	---	
						pitch pine	---	---	
						scarlet oak	---	---	
Cleveland	---	---	---	---	---	chestnut oak	---	---	See footnote 4.
						eastern white pine	---	---	
						scarlet oak	---	---	
						white oak	---	---	
						black oak	---	---	
						shortleaf pine	---	---	
						pitch pine	---	---	
Rock outcrop.									
BaA:									
Biltmore	Slight	Slight	Severe	Slight	Moderate	yellow-poplar	106	117.00	yellow-poplar, eastern white pine, American sycamore, black walnut
						eastern white pine	---	---	
						American sycamore	---	---	
						white ash	---	---	
						river birch	---	---	
BkB2:									
Braddock	Slight	Moderate	Moderate	Slight	Moderate	eastern white pine	95	176.00	eastern white pine
						northern red oak	80	62.00	
						yellow-poplar	90	90.00	
BkC2:									
Braddock	Slight	Moderate	Moderate	Slight	Moderate	eastern white pine	95	176.00	eastern white pine
						northern red oak	80	62.00	
						yellow-poplar	90	90.00	
BkD2:									
Braddock	Moderate	Moderate	Moderate	Slight	Moderate	eastern white pine	85	155.00	eastern white pine
						northern red oak	70	52.00	
						yellow-poplar	80	71.00	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
BnD:									
Buladean----------------	Moderate	Moderate	Moderate	Slight	Moderate	eastern white pine-- chestnut oak-------- white oak----------- scarlet oak--------- black oak----------- red maple----------- hickory------------- black locust-------- sourwood------------	97 --- --- --- --- --- --- --- ---	180.00 --- --- --- --- --- --- --- ---	eastern white pine, scarlet oak, chestnut oak, white oak
Chestnut----------------	Moderate	Moderate	Slight	Moderate	Moderate	eastern white pine-- scarlet oak--------- white oak----------- black oak----------- chestnut oak-------- shortleaf pine------	78 --- 70 71 69 ---	139.00 --- 52.00 53.00 51.00 ---	eastern white pine, shortleaf pine scarlet oak, chestnut oak, white oak
BnE:									
Buladean----------------	Severe	Severe	Moderate	Slight	Moderate	eastern white pine-- chestnut oak-------- white oak----------- scarlet oak--------- black oak----------- yellow-poplar------- red maple----------- hickory------------- black locust-------- sourwood------------	97 --- --- --- --- 97 --- --- --- ---	180.00 --- --- --- --- 102.00 --- --- --- ---	eastern white pine, scarlet oak, chestnut oak, white oa
Chestnut----------------	Severe	Severe	Slight	Moderate	Moderate	eastern white pine-- yellow-poplar------- scarlet oak--------- white oak----------- black oak----------- chestnut oak-------- shortleaf pine------	78 97 --- 70 71 69 ---	139.00 102.00 --- 52.00 53.00 51.00 ---	eastern white pine, shortleaf pine scarlet oak chestnut oak white oak

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
BnF:									
Buladean	Severe	Severe	Moderate	Slight	Moderate	eastern white pine	97	180.00	eastern white pine, scarlet oak, chestnut oak, white oak,
						chestnut oak	---	---	
						white oak	---	---	
						scarlet oak	---	---	
						black oak	---	---	
						red maple	---	---	
						hickory	---	---	
						black locust	---	---	
						sourwood	---	---	
Chestnut	Severe	Severe	Slight	Moderate	Moderate	eastern white pine	78	139.00	eastern white pine, shortleaf pine scarlet oak, chestnut oak, White oak,
						scarlet oak	---	---	
						white oak	70	52.00	
						black oak	71	53.00	
						chestnut oak	69	51.00	
						shortleaf pine	---	---	
CaD:									
Calvin	Slight	Moderate	Moderate	Slight	---	Virginia pine	65	100.00	Virginia pine, eastern white pine, shortleaf pine
						scarlet oak	---	---	
						chestnut oak	---	---	
						white oak	---	---	
CaE:									
Calvin	Moderate	Severe	Moderate	Slight	---	Virginia pine	65	100.00	Virginia pine, eastern white pine, shortleaf pine
						scarlet oak	---	---	
						chestnut oak	---	---	
						white oak	---	---	
CaF:									
Calvin	Moderate	Severe	Moderate	Moderate	---	Virginia pine	65	100.00	Virginia pine, eastern white pine, shortleaf pine
						scarlet oak	---	---	
						chestnut oak	---	---	
						white oak	---	---	
CfF:									
Cataska	Moderate	Severe	Severe	Severe	Moderate	chestnut oak	---	---	See footnote 4.
						pitch pine	---	---	
						Virginia pine	---	---	
Sylco	---	---	---	---	---	scarlet oak	64	47.00	See footnote 4.
						shortleaf pine	---	---	
						pitch pine	---	---	
						Virginia pine	---	---	
						chestnut oak	---	---	
						black oak	63	46.00	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
CfF:									
Rock outcrop.									
ChD:									
Cheoah------------------	Moderate	Moderate	Slight	Slight	Moderate	northern red oak----	84	66.00	northern red oak,
						yellow-poplar-------	103	112.00	yellow-poplar
						American beech------	80	---	
						black cherry--------	74	---	
						eastern hemlock-----	---	---	
						black oak-----------	---	---	
						yellow birch--------	---	---	
						sugar maple---------	---	---	
						red maple-----------	---	---	
						yellow buckeye------	---	---	
Jeffrey-----------------	Slight	Moderate	Slight	Moderate	Moderate	eastern white pine--	70	114.00	eastern white pine,
						northern red oak----	60	43.00	yellow-poplar
						yellow-poplar-------	80	72.00	
ChE:									
Cheoah------------------	Severe	Severe	Slight	Slight	Moderate	northern red oak----	84	66.00	northern red oak,
						yellow-poplar-------	103	112.00	yellow-poplar
						American beech------	80	---	
						black cherry--------	74	---	
						eastern hemlock-----	---	---	
						black oak-----------	---	---	
						yellow birch--------	---	---	
						sugar maple---------	---	---	
						red maple-----------	---	---	
						yellow buckeye------	---	---	
Jeffrey-----------------	Moderate	Severe	Slight	Moderate	Moderate	eastern white pine--	70	114.00	eastern white pine,
						northern red oak----	60	43.00	yellow-poplar
						yellow-poplar-------	80	72.00	
ChF:									
Cheoah------------------	Severe	Severe	Slight	Slight	Moderate	northern red oak----	84	66.00	northern red oak,
						yellow-poplar-------	103	112.00	yellow-poplar
						American beech------	80	---	
						black cherry--------	74	---	
						eastern hemlock-----	---	---	
						black oak-----------	---	---	
						yellow birch--------	---	---	
						sugar maple---------	---	---	
						red maple-----------	---	---	
						yellow buckeye------	---	---	

Table 11.—Woodland Management and Productivity—Continued

	Management concerns					Potential productivity			
Map symbol and soil name	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	Suggested trees to manage[3]
								cu ft/ac	
ChF:									
Jeffrey------------------	Moderate	Severe	Slight	Moderate	Moderate	eastern white pine--	70	114.00	eastern white pine, yellow-poplar
						northern red oak----	60	43.00	
						yellow-poplar-------	80	72.00	
CsD:									
Chestoa------------------	---	---	---	---	---	yellow-poplar-------	---	---	See footnote 4.
						eastern white pine--	---	---	
						northern red oak----	---	---	
						black cherry--------	---	---	
						American basswood---	---	---	
						eastern hemlock-----	---	---	
						yellow buckeye------	---	---	
CsE:									
Chestoa------------------	---	---	---	---	---	yellow-poplar-------	---	---	See footnote 4.
						eastern white pine--	---	---	
						northern red oak----	---	---	
						black cherry--------	---	---	
						American basswood---	---	---	
						eastern hemlock-----	---	---	
						yellow buckeye------	---	---	
CsF:									
Chestoa------------------	---	---	---	---	---	yellow-poplar-------	---	---	See footnote 4.
						eastern white pine--	---	---	
						northern red oak----	---	---	
						black cherry--------	---	---	
						American basswood---	---	---	
						eastern hemlock-----	---	---	
						yellow buckeye------	---	---	
CtB2:									
Clifton------------------	Slight	Moderate	Slight	Slight	Moderate	eastern white pine--	95	172.00	eastern white pine yellow poplar, white oak, chestnut oak, scarlet oak
						yellow poplar-------	---	---	
						scarlet oak---------	---	---	
						pitch pine----------	---	---	
						shortleaf pine------	---	---	
CtC2:									
Clifton------------------	Slight	Moderate	Slight	Slight	Moderate	eastern white pine--	95	172.00	eastern white pine, yellow-poplar, white oak, chestnut oak, scarlet oak
						yellow-poplar-------	---	---	
						scarlet oak---------	---	---	
						Virginia pine-------	---	---	
						pitch pine----------	---	---	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
CtD2:									
Clifton	Moderate	Moderate	Slight	Slight	Moderate	eastern white pine	95	172.00	eastern white pine,
						yellow-poplar	---	---	yellow-poplar,
						scarlet oak	---	---	white oak,
						Virginia pine	---	---	chestnut oak,
						pitch pine	---	---	scarlet oak
CtE2:									
Clifton	Severe	Severe	Slight	Slight	Moderate	eastern white pine	95	172.00	eastern white pine,
						yellow-poplar	---	---	yellow-poplar,
						scarlet oak	---	---	white oak,
						Virginia pine	---	---	chestnut oak,
						pitch pine	---	---	scarlet oak
CxC:									
Clifton	---	---	---	---	---	---	---	---	See footnote 4.
Urban land.									
DeA:									
Dellwood	Slight	Slight	Moderate	Slight	Moderate	yellow-poplar	100	107.00	yellow-poplar,
						eastern white pine	91	168.00	eastern white pine
						red maple	---	---	
						river birch	---	---	
						American sycamore	---	---	
						eastern hemlock	---	---	
Reddies	Slight	Slight	Slight	Slight	Severe	yellow-poplar	105	115.00	yellow-poplar,
						American sycamore	---	---	eastern white pine
						red maple	---	---	
						eastern white pine	---	---	
						river birch	---	---	
DrB:									
Dillard	Slight	Slight	Slight	Slight	Moderate	eastern white pine	90	166.00	eastern white pine,
						shortleaf pine	75	120.00	yellow-poplar,
						Virginia pine	80	112.00	
						yellow-poplar	95	98.00	
DtD:									
Ditney	Slight	Moderate	Moderate	Severe	Moderate	shortleaf pine	---	---	eastern white pine,
						Virginia pine	---	---	shortleaf pine
						pitch pine	---	---	
						scarlet oak	---	---	
						chestnut oak	---	---	
						black oak	---	---	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
DtD:									
Unicoi------------------	Slight	Moderate	Moderate	Severe	Slight	Virginia pine-------	40	43.00	Virginia pine
						pitch pine----------	40	29.00	
						scarlet oak---------	---	---	
						chestnut oak--------	---	---	
						black oak-----------	---	---	
DuE:									
Ditney------------------	Moderate	Severe	Severe	Severe	Moderate	shortleaf pine------	---	---	eastern white pine, shortleaf pine
						Virginia pine-------	---	---	
						pitch pine----------	---	---	
						scarlet oak---------	---	---	
						chestnut oak--------	---	---	
						black oak-----------	---	---	
Unicoi------------------	Moderate	Severe	Severe	Severe	Slight	Virginia pine-------	40	43.00	Virginia pine
						pitch pine----------	40	29.00	
						scarlet oak---------	---	---	
						chestnut oak--------	---	---	
						black oak-----------	---	---	
Rock outcrop.									
DuF:									
Ditney------------------	Moderate	Severe	Severe	Severe	Moderate	shortleaf pine------	---	---	eastern white pine, shortleaf pine
						Virginia pine-------	---	---	
						pitch pine----------	---	---	
						scarlet oak---------	---	---	
						chestnut oak--------	---	---	
						black oak-----------	---	---	
Unicoi------------------	Moderate	Severe	Severe	Severe	Slight	Virginia pine-------	40	43.00	Virginia pine
						pitch pine----------	40	29.00	
						scarlet oak---------	---	---	
						chestnut oak--------	---	---	
						black oak-----------	---	---	
Rock outcrop.									

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
EdD:									
Edneyville	Moderate	Moderate	Slight	Slight	Moderate	northern red oak	80	62.00	eastern white pine,
						shortleaf pine	64	97.00	white oak,
						Virginia pine	66	102.00	shortleaf pine,
						eastern white pine	90	166.00	northern red oak
						white oak	---	---	
						chestnut oak	---	---	
						scarlet oak	---	---	
						black oak	---	---	
Chestnut	Moderate	Moderate	Slight	Moderate	Moderate	northern red oak	76	58.00	eastern white pine,
						eastern white pine	78	139.00	white oak,
						yellow-poplar	---	---	shortleaf pine
						scarlet oak	68	50.00	
						white oak	70	52.00	
						black oak	71	53.00	
						chestnut oak	69	51.00	
						shortleaf pine	---	---	
EdE:									
Edneyville	Severe	Severe	Slight	Slight	Moderate	northern red oak	80	62.00	eastern white pine,
						shortleaf pine	64	97.00	white oak,
						Virginia pine	66	102.00	shortleaf pine,
						eastern white pine	90	166.00	northern red oak
						white oak	---	---	
						chestnut oak	---	---	
						scarlet oak	---	---	
						black oak	---	---	
Chestnut	Severe	Severe	Slight	Moderate	Moderate	northern red oak	76	58.00	eastern white pine,
						eastern white pine	78	139.00	white oak,
						yellow-poplar	---	---	shortleaf pine
						scarlet oak	68	50.00	
						white oak	70	52.00	
						black oak	71	53.00	
						chestnut oak	69	51.00	
						shortleaf pine	---	---	
EdF:									
Edneyville	Severe	Severe	Slight	Slight	Moderate	northern red oak	80	62.00	eastern white pine,
						shortleaf pine	64	97.00	white oak,
						Virginia pine	66	102.00	shortleaf pine,
						eastern white pine	90	166.00	northern red oak
						white oak	---	---	
						chestnut oak	---	---	
						scarlet oak	---	---	
						black oak	---	---	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
EdF:									
Chestnut	Severe	Severe	Slight	Moderate	Moderate	northern red oak	76	58.00	eastern white pine, white oak, shortleaf pine
						eastern white pine	78	139.00	
						yellow-poplar	---	---	
						scarlet oak	68	50.00	
						white oak	70	52.00	
						black oak	71	53.00	
						chestnut oak	69	51.00	
						shortleaf pine	---	---	
EfA:									
Ela, drained	Slight	Severe	Severe	Slight	Severe	American sycamore	---	---	eastern white pine
						common winterberry	---	---	
						eastern hemlock	---	---	
						eastern white pine	86	157.00	
						red maple	---	---	
						yellow birch	---	---	
						yellow-poplar	88	86.00	
Ela, undrained	Slight	Severe	Severe	Slight	Severe	yellow-poplar	88	86.00	yellow-poplar, eastern white pine
						eastern white pine	84	153.00	
						American sycamore	---	---	
						red maple	---	---	
						yellow birch	---	---	
						eastern hemlock	---	---	
EvD2:									
Evard	Moderate	Moderate	Slight	Slight	Moderate	eastern white pine	91	168.00	eastern white pine, shortleaf pine, white oak, chestnut oak
						yellow-poplar	95	98.00	
						white oak	75	57.00	
						Virginia pine	70	109.00	
						shortleaf pine	73	116.00	
						southern red oak	75	57.00	
						hickory	---	---	
						northern red oak	---	---	
Cowee	Moderate	Moderate	Slight	Moderate	Moderate	eastern white pine	78	139.00	eastern white pine, shortleaf pine
						yellow-poplar	80	71.00	
						chestnut oak	55	38.00	
						Virginia pine	63	96.00	
						pitch pine	52	72.00	
						scarlet oak	54	38.00	
						shortleaf pine	---	---	
						white oak	---	---	
						northern red oak	---	---	
						black oak	---	---	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
EvE2:									
Evard	Severe	Severe	Slight	Slight	Moderate	eastern white pine	91	168.00	eastern white pine, shortleaf pine, white oak, chestnut oak
						yellow-poplar	95	98.00	
						white oak	75	57.00	
						Virginia pine	70	109.00	
						shortleaf pine	73	116.00	
						southern red oak	75	57.00	
						hickory	---	---	
						northern red oak	---	---	
Cowee	Severe	Severe	Slight	Moderate	Moderate	eastern white pine	78	139.00	eastern white pine, shortleaf pine
						yellow-poplar	80	71.00	
						chestnut oak	55	38.00	
						Virginia pine	63	96.00	
						scarlet oak	54	38.00	
						shortleaf pine	---	---	
						white oak	---	---	
						northern red oak	---	---	
						black oak	---	---	
EvF2:									
Evard	Severe	Severe	Slight	Slight	Moderate	eastern white pine	91	168.00	eastern white pine, shortleaf pine, white oak, chestnut oak
						yellow-poplar	95	98.00	
						white oak	75	57.00	
						Virginia pine	70	109.00	
						shortleaf pine	73	116.00	
						southern red oak	75	57.00	
						pitch pine	---	---	
						hickory	---	---	
						northern red oak	---	---	
Cowee	Severe	Severe	Slight	Moderate	Moderate	eastern white pine	78	139.00	eastern white pine, shortleaf pine
						yellow-poplar	80	71.00	
						chestnut oak	55	38.00	
						Virginia pine	63	96.00	
						pitch pine	52	72.00	
						scarlet oak	54	38.00	
						shortleaf pine	---	---	
						white oak	---	---	
						northern red oak	---	---	
						black oak	---	---	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
EwD:									
Evard	Moderate	Moderate	Slight	Slight	Moderate	eastern white pine	91	168.00	eastern white pine, shortleaf pine, white oak, chestnut oak
						yellow-poplar	95	98.00	
						white oak	75	57.00	
						Virginia pine	70	109.00	
						shortleaf pine	73	116.00	
						southern red oak	75	57.00	
						hickory	---	---	
						northern red oak	---	---	
Cowee	Moderate	Moderate	Slight	Moderate	Moderate	eastern white pine	78	139.00	eastern white pine, shortleaf pine
						yellow-poplar	80	71.00	
						chestnut oak	55	38.00	
						Virginia pine	63	96.00	
						scarlet oak	54	38.00	
						shortleaf pine	---	---	
						white oak	---	---	
						northern red oak	---	---	
						black oak	---	---	
EwE:									
Evard	Severe	Severe	Slight	Slight	Moderate	eastern white pine	91	168.00	eastern white pine, shortleaf pine, white oak, chestnut oak
						yellow-poplar	95	98.00	
						white oak	75	57.00	
						Virginia pine	70	109.00	
						shortleaf pine	73	116.00	
						southern red oak	75	57.00	
						hickory	---	---	
						northern red oak	---	---	
Cowee	Severe	Severe	Slight	Moderate	Moderate	eastern white pine	78	139.00	eastern white pine, shortleaf pine
						yellow-poplar	80	71.00	
						chestnut oak	55	38.00	
						Virginia pine	63	96.00	
						scarlet oak	54	38.00	
						shortleaf pine	---	---	
						white oak	---	---	
						northern red oak	---	---	
						black oak	---	---	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
EwF:									
Evard-------------------	Severe	Severe	Slight	Slight	Moderate	eastern white pine--	91	168.00	eastern white pine, shortleaf pine, white oak, chestnut oak
						yellow-poplar-------	95	98.00	
						white oak-----------	75	57.00	
						Virginia pine-------	70	109.00	
						shortleaf pine------	73	116.00	
						southern red oak----	75	57.00	
						hickory-------------	---	---	
						northern red oak----	---	---	
Cowee-------------------	Severe	Severe	Slight	Moderate	Moderate	eastern white pine--	78	139.00	eastern white pine, shortleaf pine
						yellow-poplar-------	80	71.00	
						chestnut oak--------	55	38.00	
						Virginia pine-------	63	96.00	
						pitch pine----------	52	72.00	
						scarlet oak---------	54	38.00	
						shortleaf pine------	---	---	
						white oak-----------	---	---	
						northern red oak----	---	---	
						black oak-----------	---	---	
FnD2:									
Fannin------------------	Moderate	Moderate	Slight	Slight	Moderate	yellow-poplar-------	96	100.00	eastern white pine, shortleaf pine,
						shortleaf pine------	---	---	
						eastern white pine--	94	174.00	
						Virginia pine-------	---	---	
						scarlet oak---------	---	---	
						chestnut oak--------	---	---	
						northern red oak----	84	66.00	
FrA:									
French------------------	Slight	Moderate	Slight	Slight	Severe	eastern white pine--	105	196.00	eastern white pine, yellow-poplar, white ash
						yellow-poplar-------	105	115.00	
						northern red oak----	---	---	
						black cherry--------	---	---	
						red maple-----------	---	---	
						eastern hemlock-----	---	---	
HcE:									
Heintooga---------------	---	---	---	---	---	---	---	---	See footnote 4.
Chiltoskie--------------	---	---	---	---	---	---	---	---	See footnote 4.

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
HpA:									
Hemphill----------------	Slight	Severe	Severe	Slight	Severe	yellow-poplar-------	---	---	yellow-poplar, eastern white pine
						American sycamore---	---	---	
						eastern white pine--	---	---	
						eastern hemlock-----	---	---	
						red maple-----------	---	---	
JbD:									
Junaluska---------------	Moderate	Moderate	Moderate	Moderate	Moderate	scarlet oak---------	65	48.00	scarlet oak, white oak, eastern white pine, shortleaf pine
						chestnut oak--------	65	48.00	
						white oak-----------	61	44.00	
						shortleaf pine------	68	106.00	
						Virginia pine-------	74	114.00	
						eastern white pine--	86	157.00	
						pitch pine----------	---	---	
						black oak-----------	---	---	
						hickory-------------	---	---	
						black locust--------	---	---	
Brasstown---------------	Moderate	Moderate	Slight	Slight	Moderate	scarlet oak---------	80	62.00	scarlet oak, white oak, eastern white pine, shortleaf pine
						white oak-----------	80	62.00	
						eastern white pine--	91	168.00	
						shortleaf pine------	71	112.00	
						Virginia pine-------	74	114.00	
						pitch pine----------	---	---	
						black oak-----------	---	---	
						chestnut oak--------	---	---	
						hickory-------------	---	---	
						black locust--------	---	---	
JbE:									
Junaluska---------------	Severe	Severe	Moderate	Moderate	Moderate	scarlet oak---------	65	48.00	scarlet oak, white oak, eastern white pine, shortleaf pine
						chestnut oak--------	65	48.00	
						white oak-----------	61	44.00	
						shortleaf pine------	68	106.00	
						Virginia pine-------	74	114.00	
						eastern white pine--	86	157.00	
						pitch pine----------	---	---	
						black oak-----------	---	---	
						hickory-------------	---	---	
						black locust--------	---	---	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
JbE:									
Brasstown	Severe	Severe	Slight	Slight	Moderate	scarlet oak	80	62.00	scarlet oak, white oak, eastern white pine, shortleaf pine
						white oak	80	62.00	
						eastern white pine	91	168.00	
						shortleaf pine	71	112.00	
						Virginia pine	74	114.00	
						pitch pine	---	---	
						black oak	---	---	
						chestnut oak	---	---	
						hickory	---	---	
						black locust	---	---	
JbF:									
Junaluska	Severe	Severe	Moderate	Moderate	Moderate	scarlet oak	65	48.00	scarlet oak, white oak, eastern white pine, shortleaf pine
						chestnut oak	65	48.00	
						white oak	61	44.00	
						shortleaf pine	68	106.00	
						Virginia pine	74	114.00	
						eastern white pine	86	157.00	
						pitch pine	---	---	
						black oak	---	---	
						hickory	---	---	
						black locust	---	---	
Brasstown	Severe	Severe	Slight	Slight	Moderate	scarlet oak	80	62.00	scarlet oak, white oak, eastern white pine, shortleaf pine
						white oak	80	62.00	
						eastern white pine	91	168.00	
						shortleaf pine	71	112.00	
						Virginia pine	74	114.00	
						pitch pine	---	---	
						black oak	---	---	
						chestnut oak	---	---	
						hickory	---	---	
						black locust	---	---	
KnC:									
Keener	Slight	Slight	Slight	Slight	Moderate	yellow-poplar	92	93.00	yellow-poplar, eastern white pine
						eastern white pine	89	164.00	
						chestnut oak	---	---	
						eastern hemlock	---	---	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
MwC:									
Mars Hill----------------	Moderate	Moderate	Slight	Slight	Moderate	eastern white pine--	87	159.00	eastern white pine, shortleaf pine
						Virginia pine-------	75	115.00	
						shortleaf pine------	69	108.00	
						white oak-----------	69	51.00	
						hickory-------------	---	---	
						chestnut oak--------	75	57.00	
						black oak-----------	---	---	
						southern red oak----	---	---	
Walnut------------------	Moderate	Moderate	Slight	Moderate	Moderate	Virginia pine-------	---	---	eastern white pine shortleaf pine
						black oak-----------	---	---	
						chestnut oak--------	---	---	
						eastern white pine--	75	129.00	
						hickory-------------	---	---	
						shortleaf pine------	---	---	
						white oak-----------	---	---	
						southern red oak----	---	---	
MwD:									
Mars Hill----------------	Moderate	Moderate	Slight	Slight	Moderate	eastern white pine--	87	159.00	eastern white pine, shortleaf pine
						Virginia pine-------	75	115.00	
						shortleaf pine------	69	108.00	
						white oak-----------	69	51.00	
						hickory-------------	---	---	
						chestnut oak--------	75	57.00	
						black oak-----------	---	---	
						southern red oak----	---	---	
Walnut------------------	Moderate	Moderate	Slight	Moderate	Moderate	Virginia pine-------	---	---	eastern white pine shortleaf pine
						black oak-----------	---	---	
						chestnut oak--------	---	---	
						eastern white pine--	75	129.00	
						hickory-------------	---	---	
						shortleaf pine------	---	---	
						white oak-----------	---	---	
						southern red oak----	---	---	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
MwE:									
Mars Hill----------------	Severe	Severe	Slight	Slight	Moderate	eastern white pine--	87	159.00	eastern white pine, shortleaf pine
						Virginia pine-------	75	115.00	
						shortleaf pine------	69	108.00	
						white oak-----------	69	51.00	
						hickory-------------	---	---	
						chestnut oak--------	75	57.00	
						black oak-----------	---	---	
						southern red oak----	---	---	
Walnut-------------------	Severe	Severe	Slight	Moderate	Moderate	Virginia pine-------	---	---	eastern white pine shortleaf pine
						black oak-----------	---	---	
						chestnut oak--------	---	---	
						eastern white pine--	75	129.00	
						hickory-------------	---	---	
						shortleaf pine------	---	---	
						white oak-----------	---	---	
						southern red oak----	---	---	
MwF:									
Mars Hill----------------	Severe	Severe	Slight	Slight	Moderate	eastern white pine--	87	159.00	eastern white pine, shortleaf pine
						Virginia pine-------	75	115.00	
						shortleaf pine------	69	108.00	
						white oak-----------	69	51.00	
						hickory-------------	---	---	
						chestnut oak--------	75	57.00	
						black oak-----------	---	---	
						southern red oak----	---	---	
Walnut-------------------	Severe	Severe	Slight	Moderate	Moderate	Virginia pine-------	---	---	eastern white pine shortleaf pine
						black oak-----------	---	---	
						chestnut oak--------	---	---	
						eastern white pine--	75	129.00	
						hickory-------------	---	---	
						shortleaf pine------	---	---	
						white oak-----------	---	---	
						southern red oak----	---	---	

Table 11.–Woodland Management and Productivity–Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
MyB:									
Maymead-----------------	Slight	Slight	Slight	Slight	Moderate	yellow-poplar-------	125	145.00	yellow-poplar, eastern white pine, northern red oak, black cherry,
						northern red oak----	---	---	
						eastern white pine--	---	---	
						black cherry--------	---	---	
						yellow buckeye------	---	---	
						American beech------	---	---	
						eastern hemlock-----	---	---	
						yellow birch--------	---	---	
						northern red oak----	---	---	
Northcove---------------	Slight	Slight	Moderate	Slight	Moderate	yellow-poplar-------	---	---	yellow-poplar, eastern white pine, northern red oak, black cherry
						eastern white pine--	80	143.00	
						white oak-----------	---	---	
						eastern hemlock-----	---	---	
						yellow birch--------	---	---	
						northern red oak----	---	---	
						black cherry--------	---	---	
						yellow buckeye------	---	---	
						American beech------	---	---	
NhC:									
Northcove---------------	Slight	Slight	Moderate	Slight	Moderate	yellow-poplar-------	---	---	yellow-poplar, eastern white pine, northern red oak, black cherry
						eastern white pine--	80	143.00	
						white oak-----------	---	---	
						eastern hemlock-----	---	---	
						yellow birch--------	---	---	
						northern red oak----	---	---	
						black cherry--------	---	---	
						yellow buckeye------	---	---	
						American beech------	---	---	
Maymead-----------------	Slight	Slight	Slight	Slight	Moderate	yellow-poplar-------	125	145.00	yellow-poplar, eastern white pine, northern red oak, black cherry,
						northern red oak----	---	---	
						eastern white pine--	---	---	
						black cherry--------	---	---	
						yellow buckeye------	---	---	
						American beech------	---	---	
						eastern hemlock-----	---	---	
						yellow birch--------	---	---	
						northern red oak----	---	---	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
NtD:									
Northcove	Moderate	Moderate	Moderate	Slight	Moderate	yellow-poplar	---	---	yellow-poplar, eastern white pine, northern red oak, black cherry
						eastern white pine	80	143.00	
						white oak	---	---	
						eastern hemlock	---	---	
						yellow birch	---	---	
						northern red oak	---	---	
						black cherry	---	---	
						yellow buckeye	---	---	
						sugar maple	---	---	
Maymead	Moderate	Moderate	Slight	Slight	Severe	yellow poplar	125	145.00	yellow poplar, eastern white pine, northern red oak, black cherry,
						northern red oak	---	---	
						eastern white pine	---	---	
						black cherry	---	---	
						yellow buckeye	---	---	
						American beech	---	---	
						eastern hemlock	---	---	
						yellow birch	---	---	
						northern red oak	---	---	
NtE:									
Northcove	Moderate	Severe	Moderate	Slight	Moderate	yellow-poplar	---	---	yellow-poplar, eastern white pine, northern red oak, black cherry
						eastern white pine	80	143.00	
						white oak	---	---	
						eastern hemlock	---	---	
						yellow birch	---	---	
						northern red oak	---	---	
						black cherry	---	---	
						yellow buckeye	---	---	
						American beech	---	---	
Maymead	Moderate	Severe	Slight	Slight	Severe	yellow poplar	125	145.00	yellow poplar, eastern white pine, northern red oak, black cherry,
						northern red oak	---	---	
						eastern white pine	---	---	
						black cherry	---	---	
						yellow buckeye	---	---	
						American beech	---	---	
						eastern hemlock	---	---	
						yellow birch	---	---	
						northern red oak	---	---	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage^3
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index^1	Volume^2	
								cu ft/ac	
OwC:									
Oconaluftee-------------	---	---	---	---	---	northern red oak----	40	29.00	See footnote 4.
Guyot-------------------	---	---	---	---	---	northern red oak----	40	29.00	See footnote 4.
Cataloochee-------------	---	---	---	---	---	northern red oak----	40	29.00	See footnote 4.
OwD:									
Oconaluftee-------------	---	---	---	---	---	northern red oak----	40	29.00	See footnote 4.
Guyot-------------------	---	---	---	---	---	northern red oak----	40	29.00	See footnote 4.
Cataloochee-------------	---	---	---	---	---	northern red oak----	40	29.00	See footnote 4.
OwE:									
Oconaluftee-------------	---	---	---	---	---	northern red oak----	40	29.00	See footnote 4.
Guyot-------------------	---	---	---	---	---	northern red oak----	40	29.00	See footnote 4.
Cataloochee-------------	---	---	---	---	---	northern red oak----	40	29.00	See footnote 4.
OwF:									
Oconaluftee-------------	---	---	---	---	---	northern red oak----	40	29.00	See footnote 4.
Guyot-------------------	---	---	---	---	---	northern red oak----	40	29.00	See footnote 4.
Cataloochee-------------	---	---	---	---	---	northern red oak----	40	29.00	See footnote 4.
PwC:									
Porters-----------------	Slight	Slight	Slight	Slight	Moderate	northern red oak----	82	64.00	yellow-poplar, northern red oak, black cherry, white ash
						yellow-poplar-------	97	102.00	
						eastern white pine--	88	162.00	
						black cherry--------	---	---	
						white ash-----------	---	---	
Unaka-------------------	Slight	Slight	Slight	Moderate	Moderate	yellow-poplar-------	90	86.00	yellow-poplar, northern red oak
						northern red oak----	77	57.00	
						eastern white pine--	---	143.00	
PwD:									
Porters-----------------	Moderate	Moderate	Slight	Slight	Moderate	northern red oak----	82	64.00	yellow-poplar, northern red oak, black cherry, white ash
						yellow-poplar-------	97	102.00	
						eastern white pine--	88	162.00	
						black cherry--------	---	---	
						white ash-----------	---	---	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
PwD:									
Unaka	Slight	Moderate	Slight	Moderate	Moderate	yellow-poplar	90	86.00	yellow-poplar,
						northern red oak	77	57.00	northern red oak
						eastern white pine	---	143.00	
PwE:									
Porters	Severe	Severe	Slight	Slight	Moderate	northern red oak	82	64.00	yellow-poplar,
						yellow-poplar	97	102.00	northern red oak,
						eastern white pine	88	162.00	black cherry,
						black cherry	---	---	white ash
						white ash	---	---	
Unaka	Moderate	Severe	Slight	Moderate	Moderate	yellow-poplar	90	86.00	yellow-poplar,
						northern red oak	77	57.00	northern red oak
						eastern white pine	---	143.00	
PxF:									
Porters	Severe	Severe	Slight	Slight	Moderate	northern red oak	82	64.00	yellow-poplar,
						yellow-poplar	97	102.00	northern red oak,
						eastern white pine	88	162.00	black cherry,
						black cherry	---	---	white ash
						white ash	---	---	
Unaka	Moderate	Severe	Slight	Moderate	Moderate	yellow-poplar	90	86.00	yellow-poplar,
						northern red oak	77	57.00	northern red oak
						eastern white pine	---	143.00	
RbA:									
Reddies	Slight	Slight	Slight	Slight	Severe	yellow-poplar	105	115.00	yellow-poplar,
						American sycamore	---	---	eastern white pine
						red maple	---	---	
						eastern white pine	---	---	
						river birch	---	---	
RcF:									
Rock outcrop.									
Cataska	---	---	---	---	---	pitch pine	40	---	See footnote 4.
						Virginia pine	---	---	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
RhD:									
Rock outcrop.									
Chestoa	---	---	---	---	---	yellow-poplar	---	---	See footnote 4.
						eastern white pine	---	---	
						northern red oak	---	---	
						black cherry	---	---	
						American basswood	---	---	
						eastern hemlock	---	---	
						yellow buckeye	---	---	
RhF:									
Rock outcrop.									
Chestoa	---	---	---	---	---	yellow-poplar	---	---	See footnote 4.
						eastern white pine	---	---	
						northern red oak	---	---	
						black cherry	---	---	
						American basswood	---	---	
						eastern hemlock	---	---	
						yellow buckeye	---	---	
RkF:									
Rock outcrop.									
Cleveland	---	---	---	---	---	chestnut oak	---	---	See footnote 4.
						eastern white pine	---	---	
						Virginia pine	---	---	
						scarlet oak	---	---	
						black oak	---	---	
						shortleaf pine	---	---	
						pitch pine	---	---	
RoF:									
Rock outcrop.									
Oteen	---	---	---	---	---	Virginia pine	64	98.00	See footnote 4.
						shortleaf pine	67	103.00	
						eastern white pine	---	---	
						pitch pine	---	---	
						black oak	---	---	
						chestnut oak	---	---	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
RpF:									
Rock outcrop.									
Unicoi	---	---	---	---	---	Virginia pine	---	---	See footnote 4.
						chestnut oak	---	---	
						scarlet oak	---	---	
						black oak	---	---	
RsA:									
Rosman	Slight	Slight	Slight	Slight	Severe	yellow-poplar	40	114.00	yellow-poplar, black cherry
						American sycamore	---	---	
						red maple	---	---	
						river birch	---	---	
						black cherry	---	---	
						American beech	---	---	
						black locust	---	---	
SoD:									
Soco	Moderate	Moderate	Slight	Moderate	Moderate	eastern white pine	85	155.00	eastern white pine, shortleaf pine, chestnut oak, white oak
						shortleaf pine	61	90.00	
						Virginia pine	---	---	
						chestnut oak	68	50.00	
						scarlet oak	76	58.00	
						white oak	---	---	
						black oak	---	---	
Stecoah	Moderate	Moderate	Slight	Slight	Moderate	eastern white pine	91	168.00	eastern white pine shortleaf pine, chestnut oak, white oak
						shortleaf pine	68	108.00	
						scarlet oak	---	---	
						white oak	82	64.00	
						chestnut oak	---	---	
						Virginia pine	---	---	
						hickory	---	---	
						black oak	---	---	
SoE:									
Soco	Severe	Severe	Slight	Moderate	Moderate	eastern white pine	85	155.00	eastern white pine, shortleaf pine, chestnut oak, white oak
						shortleaf pine	61	90.00	
						Virginia pine	---	---	
						chestnut oak	68	50.00	
						scarlet oak	76	58.00	
						white oak	---	---	
						black oak	---	---	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
SoE:									
Stecoah	Severe	Severe	Slight	Slight	Moderate	eastern white pine	91	168.00	eastern white pine shortleaf pine, chestnut oak, white oak
						shortleaf pine	68	108.00	
						scarlet oak	---	---	
						white oak	82	64.00	
						chestnut oak	---	---	
						Virginia pine	---	---	
						hickory	---	---	
						black oak	---	---	
SoF:									
Soco	Severe	Severe	Slight	Moderate	Moderate	eastern white pine	85	155.00	eastern white pine, shortleaf pine, chestnut oak, white oak
						shortleaf pine	61	90.00	
						Virginia pine	---	---	
						chestnut oak	68	50.00	
						scarlet oak	76	58.00	
						white oak	---	---	
						black oak	---	---	
Stecoah	Severe	Severe	Slight	Slight	Moderate	eastern white pine	91	168.00	eastern white pine shortleaf pine, chestnut oak, white oak
						shortleaf pine	68	108.00	
						scarlet oak	---	---	
						white oak	82	64.00	
						chestnut oak	---	---	
						Virginia pine	---	---	
						hickory	---	---	
						black oak	---	---	
StB:									
Statler	Slight	Slight	Slight	Slight	Severe	yellow-poplar	100	107.00	yellow-poplar, eastern white pine
						white oak	80	62.00	
						eastern white pine	90	166.00	
						red maple	---	---	
						northern red oak	---	---	
						hickory	---	---	
SwD:									
Sylco	---	---	---	---	---	scarlet oak	64	47.00	See footnote 4.
						shortleaf pine	---	---	
						pitch pine	---	---	
						Virginia pine	---	---	
						chestnut oak	---	---	
						black oak	63	46.00	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
SwD:									
Cataska------------------	---	---	---	---	---	pitch pine----------	---	---	See footnote 4.
						Virginia pine-------	---	---	
SwE:									
Sylco--------------------	---	---	---	---	---	scarlet oak---------	64	47.00	See footnote 4.
						shortleaf pine------	---	---	
						pitch pine----------	---	---	
						Virginia pine-------	---	---	
						chestnut oak--------	---	---	
						black oak-----------	63	46.00	
Cataska------------------	---	---	---	---	---	pitch pine----------	---	---	See footnote 4.
						Virginia pine-------	---	---	
Rock outcrop.									
SyD:									
Sylco--------------------	Moderate	Moderate	Severe	Moderate	Moderate	scarlet oak---------	64	47.00	Virginia pine, shortleaf pine
						shortleaf pine------	---	---	
						pitch pine----------	---	---	
						Virginia pine-------	---	---	
						chestnut oak--------	---	---	
						black oak-----------	63	46.00	
Soco---------------------	Moderate	Moderate	Moderate	Moderate	Moderate	eastern white pine--	85	155.00	eastern white pine, shortleaf pine, chestnut oak, white oak
						shortleaf pine------	61	90.00	
						pitch pine----------	---	---	
						Virginia pine-------	---	---	
						chestnut oak--------	68	50.00	
						scarlet oak---------	76	58.00	
						white oak-----------	---	---	
						black oak-----------	---	---	
SyE:									
Sylco--------------------	Moderate	Severe	Severe	Moderate	Moderate	scarlet oak---------	64	47.00	Virginia pine, shortleaf pine
						shortleaf pine------	---	---	
						pitch pine----------	---	---	
						Virginia pine-------	---	---	
						chestnut oak--------	---	---	
						black oak-----------	63	46.00	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
SyE:									
Soco--------------------	Severe	Severe	Slight	Moderate	Moderate	eastern white pine--	85	155.00	eastern white pine, shortleaf pine, chestnut oak, white oak
						shortleaf pine------	61	90.00	
						pitch pine----------	---	---	
						Virginia pine-------	---	---	
						chestnut oak--------	68	50.00	
						scarlet oak---------	76	58.00	
						white oak-----------	---	---	
						black oak-----------	---	---	
SzF:									
Sylco-------------------	Moderate	Severe	Severe	Moderate	Moderate	scarlet oak---------	64	47.00	Virginia pine, shortleaf pine
						shortleaf pine------	---	---	
						pitch pine----------	---	---	
						Virginia pine-------	---	---	
						chestnut oak--------	---	---	
						black oak-----------	63	46.00	
Soco--------------------	Severe	Severe	Moderate	Moderate	Moderate	eastern white pine--	85	155.00	eastern white pine, shortleaf pine, chestnut oak, white oak
						shortleaf pine------	61	90.00	
						pitch pine----------	---	---	
						Virginia pine-------	---	---	
						chestnut oak--------	68	50.00	
						scarlet oak---------	76	58.00	
						white oak-----------	---	---	
						black oak-----------	---	---	
TaB:									
Tate--------------------	Slight	Slight	Slight	Slight	Moderate	yellow-poplar-------	92	83.00	yellow-poplar, eastern white pine
						eastern white pine--	89	164.00	
						northern red oak----	---	---	
						black locust--------	---	---	
						eastern hemlock-----	---	---	
						white oak-----------	---	---	
TaC:									
Tate--------------------	Slight	Slight	Slight	Slight	Moderate	yellow-poplar-------	92	83.00	yellow-poplar, eastern white pine
						eastern white pine--	89	164.00	
						northern red oak----	---	---	
						black locust--------	---	---	
						eastern hemlock-----	---	---	
						white oak-----------	---	---	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
TaD:									
Tate	Moderate	Moderate	Slight	Slight	Moderate	yellow-poplar	92	83.00	yellow-poplar, eastern white pine
						eastern white pine	89	164.00	
						northern red oak	---	---	
						black locust	---	---	
						eastern hemlock	---	---	
						white oak	---	---	
TkC:									
Tate	Slight	Slight	Slight	Slight	Moderate	yellow-poplar	92	83.00	yellow-poplar, eastern white pine
						eastern white pine	89	164.00	
						northern red oak	---	---	
						black locust	---	---	
						eastern hemlock	---	---	
						white oak	---	---	
TkD:									
Tate	Slight	Moderate	Slight	Slight	Moderate	yellow-poplar	92	83.00	yellow-poplar, eastern white pine
						eastern white pine	89	164.00	
						northern red oak	---	---	
						black locust	---	---	
						eastern hemlock	---	---	
						white oak	---	---	
TmC:									
Tate	---	---	---	---	---	---	---	---	See footnote 4.
Urban land.									
ToD:									
Toecane	Moderate	Severe	Moderate	Slight	Moderate	yellow-poplar	104	114.00	yellow-poplar, eastern white pine, northern red oak, black cherry
						eastern hemlock	---	---	
						yellow birch	---	---	
						northern red oak	---	---	
						black cherry	---	---	
ToE:									
Toecane	Severe	Severe	Moderate	Slight	Moderate	yellow-poplar	104	114.00	yellow-poplar, eastern white pine, northern red oak, black cherry
						eastern hemlock	---	---	
						yellow birch	---	---	
						northern red oak	---	---	
						black cherry	---	---	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
TrC:									
Toecane	Slight	Moderate	Slight	Slight	Severe	yellow-poplar	104	114.00	yellow-poplar, eastern white pine, northern red oak, black cherry
						eastern hemlock	---	---	
						yellow birch	---	---	
						northern red oak	---	---	
						black cherry	---	---	
Tusquitee	Slight	Moderate	Slight	Slight	Severe	yellow-poplar	103	112.00	yellow-poplar, eastern white pine, black cherry, northern red oak, white ash
						eastern white pine	100	186.00	
						northern red oak	---	---	
						black cherry	83	---	
						hickory	---	---	
						black locust	---	---	
						eastern hemlock	---	---	
						white oak	---	---	
						American beech	---	---	
						white ash	---	---	
TsD:									
Toecane	Moderate	Severe	Slight	Slight	Severe	yellow-poplar	104	114.00	yellow-poplar, eastern white pine, northern red oak, black cherry
						eastern hemlock	---	---	
						yellow birch	---	---	
						northern red oak	---	---	
						black cherry	---	---	
Tusquitee	Moderate	Severe	Slight	Slight	Severe	yellow-poplar	103	112.00	yellow-poplar, eastern white pine, black cherry, northern red oak, white ash
						eastern white pine	100	186.00	
						northern red oak	---	---	
						black cherry	83	---	
						hickory	---	---	
						black locust	---	---	
						eastern hemlock	---	---	
						white oak	---	---	
						American beech	---	---	
						white ash	---	---	
TsE:									
Toecane	Severe	Severe	Slight	Slight	Severe	yellow-poplar	104	114.00	yellow-poplar, eastern white pine, northern red oak, black cherry
						eastern hemlock	---	---	
						yellow birch	---	---	
						northern red oak	---	---	
						black cherry	---	---	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
TsE:									
Tusquitee	Severe	Severe	Slight	Slight	Severe	yellow-poplar	103	112.00	yellow-poplar, eastern white pine, black cherry, northern red oak, white ash
						eastern white pine	100	186.00	
						northern red oak	---	---	
						black cherry	83	---	
						hickory	---	---	
						black locust	---	---	
						eastern hemlock	---	---	
						white oak	---	---	
						American beech	---	---	
						white ash	---	---	
TuD:									
Tusquitee	Moderate	Moderate	Slight	Slight	Severe	yellow-poplar	103	112.00	yellow-poplar, eastern white pine, black cherry, northern red oak, white ash
						eastern white pine	100	186.00	
						northern red oak	---	---	
						black cherry	83	---	
						hickory	---	---	
						black locust	---	---	
						eastern hemlock	---	---	
						white oak	---	---	
						American beech	---	---	
						white ash	---	---	
Toecane	Moderate	Moderate	Moderate	Slight	Moderate	yellow-poplar	104	114.00	yellow-poplar, eastern white pine, northern red oak, black cherry
						eastern hemlock	---	---	
						yellow birch	---	---	
						northern red oak	---	---	
						black cherry	---	---	
TwB:									
Tusquitee	Slight	Slight	Slight	Slight	Severe	yellow-poplar	103	112.00	yellow-poplar, eastern white pine, black cherry, northern red oak, white ash
						eastern white pine	100	186.00	
						northern red oak	---	---	
						black cherry	83	---	
						hickory	---	---	
						black locust	---	---	
						eastern hemlock	---	---	
						white oak	---	---	
						American beech	---	---	
						white ash	---	---	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
TwB:									
Whiteside	Slight	Slight	Slight	Slight	Severe	yellow-poplar	95	98.00	black cherry, eastern white pine, yellow-poplar
						eastern white pine	90	166.00	
						black cherry	90	---	
						eastern hemlock	---	---	
						sugar maple	---	---	
						red maple	---	---	
						white oak	---	---	
						sweet birch	---	---	
						black locust	---	---	
TwC:									
Tusquitee	Slight	Slight	Slight	Slight	Severe	yellow-poplar	103	112.00	yellow-poplar, eastern white pine, black cherry, northern red oak, white ash
						eastern white pine	100	186.00	
						northern red oak	---	---	
						black cherry	83	---	
						hickory	---	---	
						black locust	---	---	
						eastern hemlock	---	---	
						white oak	---	---	
						American beech	---	---	
						white ash	---	---	
Whiteside	Slight	Slight	Slight	Slight	Severe	yellow-poplar	95	98.00	black cherry, eastern white pine, yellow-poplar
						eastern white pine	90	166.00	
						black cherry	90	---	
						eastern hemlock	---	---	
						red maple	---	---	
						white oak	---	---	
						sweet birch	---	---	
						black locust	---	---	
UcB:									
Udifluvents	---	---	---	---	---	---	---	---	See footnote 4.
Ud:									
Udorthents	---	---	---	---	---	---	---	---	See footnote 4.
UfB:									
Udorthents	---	---	---	---	---	---	---	---	See footnote 4.
Urban land.									
UhE:									
Udorthents	---	---	---	---	---	---	---	---	See footnote 4.
Urban land.									

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
UkE:									
Unaka-------------------	---	---	---	---	---	yellow-poplar-------	90	86.00	See footnote 4.
						eastern white pine--	---	143.00	
						northern red oak----	77	57.00	
Rock outcrop.									
UkF:									
Unaka-------------------	---	---	---	---	---	yellow-poplar-------	90	86.00	See footnote 4.
						eastern white pine--	---	143.00	
						northern red oak----	77	57.00	
Rock outcrop.									
UrD:									
Unicoi------------------	---	---	---	---	---	Virginia pine-------	---	---	See footnote 4.
						chestnut oak--------	---	---	
						scarlet oak---------	---	---	
						black oak-----------	---	---	
Rock outcrop.									
UsB:									
Unison------------------	Slight	Slight	Slight	Slight	Severe	yellow-poplar-------	---	---	yellow-poplar, eastern white pine
						eastern white pine--			
						short leaf pine-----			
						white oak-----------			
						northern red oak----			
UsC:									
Unison------------------	Slight	Slight	Slight	Slight	Severe	yellow-poplar-------	---	---	yellow-poplar, eastern white pine
						eastern white pine--			
						short leaf pine-----			
						white oak-----------			
						northern red oak----			
UsD:									
Unison------------------	Slight	Moderate	Slight	Slight	Severe	yellow-poplar-------	---	---	yellow-poplar, eastern white pine
						eastern white pine--			
						short leaf pine-----			
						white oak-----------			
						northern red oak----			
W.									
Water									

Table 11.–Woodland Management and Productivity–Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
WaC2:									
Walnut------------------	Slight	Slight	Slight	Moderate	Moderate	Virginia pine-------	---	---	eastern white pine,
						black oak-----------	---	---	short leaf pine
						chestnut oak--------	---	---	
						eastern white pine--	75	129.00	
						hickory-------------	---	---	
						shortleaf pine------	---	---	
						white oak-----------	---	---	
						pitch pine----------	---	---	
Oteen-------------------	Slight	Slight	Severe	Severe	Slight	Virginia pine-------	64	98.00	shortleaf pine,
						shortleaf pine------	67	103.00	Virginia pine
						pitch pine----------	---	---	
						black oak-----------	---	---	
						chestnut oak--------	---	---	
WaC2:									
Mars Hill---------------	Slight	Slight	Slight	Slight	Moderate	eastern white pine--	87	159.00	eastern white pine,
						Virginia pine-------	75	115.00	shortleaf pine
						shortleaf pine------	69	108.00	
						white oak-----------	69	51.00	
						hickory-------------	---	---	
						chestnut oak--------	75	57.00	
						black oak-----------	---	---	
						pitch pine----------	---	---	
WaD2:									
Walnut------------------	Moderate	Moderate	Slight	Moderate	Moderate	Virginia pine-------	---	---	eastern white pine,
						black oak-----------	---	---	short leaf pine
						chestnut oak--------	---	---	
						eastern white pine--	75	129.00	
						hickory-------------	---	---	
						shortleaf pine------	---	---	
						white oak-----------	---	---	
						pitch pine----------	---	---	
Oteen-------------------	Moderate	Moderate	Severe	Severe	Slight	Virginia pine-------	64	98.00	shortleaf pine,
						shortleaf pine------	67	103.00	Virginia pine
						pitch pine----------	---	---	
						black oak-----------	---	---	
						chestnut oak--------	---	---	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage^3
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index^1	Volume^2	
								cu ft/ac	
WaD2:									
Mars Hill---------------	Moderate	Moderate	Slight	Slight	Moderate	eastern white pine--	87	159.00	eastern white pine, shortleaf pine
						Virginia pine-------	75	115.00	
						shortleaf pine------	69	108.00	
						white oak-----------	69	51.00	
						hickory-------------	---	---	
						chestnut oak--------	75	57.00	
						black oak-----------	---	---	
						pitch pine----------	---	---	
WaE2:									
Walnut------------------	Severe	Severe	Slight	Moderate	Moderate	Virginia pine-------	---	---	eastern white pine, short leaf pine
						black oak-----------	---	---	
						chestnut oak--------	---	---	
						eastern white pine--	75	129.00	
						hickory-------------	---	---	
						shortleaf pine------	---	---	
						white oak-----------	---	---	
						pitch pine----------	---	---	
Oteen-------------------	Severe	Severe	Severe	Severe	Slight	Virginia pine-------	64	98.00	shortleaf pine, Virginia pine
						shortleaf pine------	67	103.00	
						pitch pine----------	---	---	
						black oak-----------	---	---	
						chestnut oak--------	---	---	
Mars Hill---------------	Severe	Severe	Slight	Slight	Moderate	eastern white pine--	87	159.00	eastern white pine, shortleaf pine
						Virginia pine-------	75	115.00	
						shortleaf pine------	69	108.00	
						white oak-----------	69	51.00	
						hickory-------------	---	---	
						chestnut oak--------	75	57.00	
						black oak-----------	---	---	
						pitch pine----------	---	---	
WoF:									
Walnut------------------	---	---	---	---	---	Virginia pine-------	---	---	See footnote 4.
						black oak-----------	---	---	
						chestnut oak--------	---	---	
						eastern white pine--	---	---	
						hickory-------------	---	---	
						shortleaf pine------	---	---	
						white oak-----------	---	---	
						pitch pine----------	---	---	

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equip-ment limita-tion	Seedling mortal-ity	Wind-throw hazard	Plant competi-tion	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
WoF:									
Oteen-------------------	---	---	---	---	---	Virginia pine------- shortleaf pine------ pitch pine---------- black oak----------- chestnut oak--------	--- --- --- --- ---	--- --- --- --- ---	See footnote 4.
Rock outcrop.									
WrC:									
Wayah-------------------	---	---	---	---	---	northern red oak----	43	28.00	See footnote 4.
Burton------------------	---	---	---	---	---	northern red oak----	---	---	See footnote 4.
WrD:									
Wayah-------------------	---	---	---	---	---	northern red oak----	43	28.00	See footnote 4.
Burton------------------	---	---	---	---	---	northern red oak----	---	---	See footnote 4.
WrE:									
Wayah-------------------	---	---	---	---	---	northern red oak----	43	28.00	See footnote 4.
Burton------------------	---	---	---	---	---	northern red oak----	---	---	See footnote 4.
WsF:									
Wayah-------------------	---	---	---	---	---	northern red oak----	43	28.00	See footnote 4.
Burton------------------	---	---	---	---	---	northern red oak----	---	---	See footnote 4.

Table 11.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to manage[3]
	Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Wind- throw hazard	Plant competi- tion	Common trees	Site index[1]	Volume[2]	
								cu ft/ac	
WtB:									
Whiteside	Slight	Slight	Slight	Slight	Severe	black cherry	90	57.00	black cherry, eastern white pine, yellow-poplar
						black locust	---	---	
						eastern hemlock	---	---	
						eastern white pine	90	172.00	
						red maple	---	---	
						sweet birch	---	---	
						white oak	---	---	
						yellow-poplar	95	100.00	

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[1] Site indices were assigned using available plot data and comparison curves. Where insufficient plot data existed, site index was assigned based on data from soils with similar properties. Where no data and no soil with similar properties existed, soils were assigned a probable ordination symbol without any site indices. Site index may vary considerably among sites with the same soil because of the influence of past management, climate, relief, landform position, aspect, drainage, parent material, and elevation.

[2] Potential productivity is measured as yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked, natural stands. Cubic feet can be converted to board feet by multiplying by about 5.

[3] If hardwoods are desired on a forest site, rely on natural reproduction (seeds and sprouts) of acceptable species. Special site preparation techniques may be required. Planting of hardwoods on a site should be based on the recommendation of a professional forester.

[4] This is a noncommercial forest land unit. See map unit descriptions for composition and management concerns.

Table 12.—Recreational Development, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Camp areas		Picnic areas	
	Rating class and limiting features	Value	Rating class and limiting features	Value
AcD:				
Ashe	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
Cleveland	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Large stones content	0.53	Large stones content	0.53
Rock outcrop	Not rated		Not rated	
ArE:				
Ashe	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47
Cleveland	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Large stones content	0.47	Large stones content	0.47
Rock outcrop	Not rated		Not rated	
ArF:				
Ashe	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47
Cleveland	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Large stones content	0.47	Large stones content	0.47
Rock outcrop	Not rated		Not rated	
BaA:				
Biltmore	Very limited		Somewhat limited	
	Flooding	1.00	Too sandy	0.42
	Too sandy	0.42		
BkB2:				
Braddock	Not limited		Not limited	
BkC2:				
Braddock	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63

Table 12.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas		Picnic areas	
	Rating class and limiting features	Value	Rating class and limiting features	Value
BkD2:				
Braddock	Very limited		Very limited	
	Slope	1.00	Slope	1.00
BnD:				
Buladean	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Chestnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
BnE:				
Buladean	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Chestnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
BnF:				
Buladean	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Chestnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
CaD:				
Calvin	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Gravel content	0.04	Gravel content	0.04
CaE:				
Calvin	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Gravel content	0.04	Gravel content	0.04
CaF:				
Calvin	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Gravel content	0.04	Gravel content	0.04
CfF:				
Cataska	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Large stones content	0.53	Large stones content	0.53
	Gravel content	0.04	Gravel content	0.04
Sylco	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Gravel content	1.00	Gravel content	1.00
	Large stones content	0.53	Large stones content	0.53
Rock outcrop	Not rated		Not rated	

Table 12.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas		Picnic areas	
	Rating class and limiting features	Value	Rating class and limiting features	Value
ChD:				
Cheoah--------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Jeffrey-------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
ChE:				
Cheoah--------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Jeffrey-------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
ChF:				
Cheoah--------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Jeffrey-------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
CsD:				
Chestoa-------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
CsE:				
Chestoa-------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
CsF:				
Chestoa-------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
CtB2:				
Clifton-------------	Not limited		Not limited	
CtC2:				
Clifton-------------	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
CtD2:				
Clifton-------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
CtE2:				
Clifton-------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
CxC:				
Clifton-------------	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
Urban land----------	Not rated		Not rated	

Table 12.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas		Picnic areas	
	Rating class and limiting features	Value	Rating class and limiting features	Value
DeA:				
Dellwood	Very limited		Somewhat limited	
	Flooding	1.00	Gravel content	0.06
	Gravel content	0.06		
Reddies	Very limited		Not limited	
	Flooding	1.00		
DrB:				
Dillard	Very limited		Not limited	
	Flooding	1.00		
DtD:				
Ditney	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
Unicoi	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Large stones content	0.53	Large stones content	0.53
DuE:				
Ditney	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
Unicoi	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Large stones content	0.53	Large stones content	0.53
DuF:				
Ditney	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
Unicoi	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Large stones content	0.53	Large stones content	0.53
	Gravel content	0.01	Gravel content	0.01
EdD:				
Edneyville	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Chestnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
EdE:				
Edneyville	Very limited		Very limited	
	Slope	1.00	Slope	1.00

Table 12.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas		Picnic areas	
	Rating class and limiting features	Value	Rating class and limiting features	Value
EdE:				
Chestnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
EdF:				
Edneyville	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Chestnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
EfA:				
Ela	Very limited		Very limited	
	Depth to saturated zone	1.00	Ponding	1.00
	Flooding	1.00	Depth to saturated zone	1.00
	Ponding	1.00	Flooding	0.40
EvD2:				
Evard	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Cowee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
EvE2:				
Evard	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Cowee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
EvF2:				
Evard	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Cowee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
EwD:				
Evard	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Cowee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
EwE:				
Evard	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Cowee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
EwF:				
Evard	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Cowee	Very limited		Very limited	
	Slope	1.00	Slope	1.00

Table 12.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas		Picnic areas	
	Rating class and limiting features	Value	Rating class and limiting features	Value
FnD2:				
Fannin	Very limited		Very limited	
	Slope	1.00	Slope	1.00
FrA:				
French	Very limited		Somewhat limited	
	Flooding	1.00	Depth to saturated zone	0.48
	Depth to saturated zone	0.81		
HcE:				
Heintooga	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.99	Large stones content	0.99
Chiltoskie	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
HpA:				
Hemphill, drained	Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Flooding	1.00	Slow water movement	0.96
	Slow water movement	0.96		
Hemphill, undrained	Very limited		Very limited	
	Depth to saturated zone	1.00	Ponding	1.00
	Flooding	1.00	Depth to saturated zone	1.00
	Ponding	1.00	Slow water movement	0.96
	Slow water movement	0.96		
JbD:				
Junaluska	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Slow water movement	0.26	Slow water movement	0.26
Brasstown	Very limited		Very limited	
	Slope	1.00	Slope	1.00
JbE:				
Junaluska	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Slow water movement	0.26	Slow water movement	0.26
Brasstown	Very limited		Very limited	
	Slope	1.00	Slope	1.00
JbF:				
Junaluska	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Slow water movement	0.26	Slow water movement	0.26
Brasstown	Very limited		Very limited	
	Slope	1.00	Slope	1.00

Table 12.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas		Picnic areas	
	Rating class and limiting features	Value	Rating class and limiting features	Value
KnC:				
Keener	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
MwC:				
Mars Hill	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
	Too sandy	0.01	Too sandy	0.01
Walnut	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
MwD:				
Mars Hill	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Too sandy	0.01	Too sandy	0.01
Walnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
MwE:				
Mars Hill	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Too sandy	0.01	Too sandy	0.01
Walnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
MwF:				
Mars Hill	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Too sandy	0.01	Too sandy	0.01
Walnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
MyB:				
Maymead	Not limited		Not limited	
Northcove	Somewhat limited		Somewhat limited	
	Large stones content	0.42	Large stones content	0.42
NhC:				
Northcove	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
	Large stones content	0.42	Large stones content	0.42
Maymead	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
NtD:				
Northcove	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53

Table 12.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas		Picnic areas	
	Rating class and limiting features	Value	Rating class and limiting features	Value
NtD:				
Maymead	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
NtE:				
Northcove	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
Maymead	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
OwC:				
Oconaluftee	Somewhat limited		Somewhat limited	
	Slope	0.37	Slope	0.37
	Gravel content	0.21	Gravel content	0.21
Guyot	Somewhat limited		Somewhat limited	
	Slope	0.37	Slope	0.37
Cataloochee	Very limited		Very limited	
	Too acid	1.00	Too acid	1.00
	Slope	0.37	Slope	0.37
OwD:				
Oconaluftee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Gravel content	0.21	Gravel content	0.21
Guyot	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Cataloochee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Too acid	1.00	Too acid	1.00
OwE:				
Oconaluftee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Gravel content	0.21	Gravel content	0.21
Guyot	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Cataloochee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Too acid	1.00	Too acid	1.00
OwF:				
Oconaluftee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Gravel content	0.21	Gravel content	0.21

Table 12.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas		Picnic areas	
	Rating class and limiting features	Value	Rating class and limiting features	Value
OwF:				
Guyot	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Cataloochee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Too acid	1.00	Too acid	1.00
PwC:				
Porters	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
Unaka	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
PwD:				
Porters	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Unaka	Very limited		Very limited	
	Slope	1.00	Slope	1.00
PwE:				
Porters	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Unaka	Very limited		Very limited	
	Slope	1.00	Slope	1.00
PxF:				
Porters	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Unaka	Very limited		Very limited	
	Slope	1.00	Slope	1.00
RbA:				
Reddies	Very limited		Not limited	
	Flooding	1.00		
RcF:				
Rock outcrop	Not rated		Not rated	
Cataska	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Gravel content	0.14	Gravel content	0.14
RhD:				
Rock outcrop	Not rated		Not rated	
Chestoa	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47

Table 12.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas		Picnic areas	
	Rating class and limiting features	Value	Rating class and limiting features	Value
RhF:				
Rock outcrop	Not rated		Not rated	
Chestoa	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47
RkF:				
Rock outcrop	Not rated		Not rated	
Cleveland	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Large stones content	0.53	Large stones content	0.53
RoF:				
Rock outcrop	Not rated		Not rated	
Oteen	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Large stones content	0.47	Large stones content	0.47
RpF:				
Rock outcrop	Not rated		Not rated	
Unicoi	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Slow water movement	1.00	Slow water movement	1.00
	Large stones content	1.00	Large stones content	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
RsA:				
Rosman	Very limited		Not limited	
	Flooding	1.00		
SoD:				
Soco	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Slow water movement	0.26	Slow water movement	0.26
Stecoah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
SoE:				
Soco	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Slow water movement	0.26	Slow water movement	0.26
Stecoah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
SoF:				
Soco	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Slow water movement	0.26	Slow water movement	0.26

Table 12.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas		Picnic areas	
	Rating class and limiting features	Value	Rating class and limiting features	Value
SoF:				
Stecoah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
StB:				
Statler	Very limited		Not limited	
	Flooding	1.00		
SwD:				
Sylco	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
Cataska	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Large stones content	0.53	Large stones content	0.53
SwE:				
Sylco	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
Cataska	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Large stones content	0.53	Large stones content	0.53
SyD:				
Sylco	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Soco	Very limited		Very limited	
	Slope	1.00	Slope	1.00
SyE:				
Sylco	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Soco	Very limited		Very limited	
	Slope	1.00	Slope	1.00
SzF:				
Sylco	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
Soco	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
TaB:				
Tate	Not limited		Not limited	

Table 12.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas		Picnic areas	
	Rating class and limiting features	Value	Rating class and limiting features	Value
TaC:				
Tate	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
TaD:				
Tate	Very limited		Very limited	
	Slope	1.00	Slope	1.00
TkC:				
Tate	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
	Large stones content	0.53	Large stones content	0.53
TkD:				
Tate	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
TmC:				
Tate	Somewhat limited		Somewhat limited	
	Slope	0.04	Slope	0.04
Urban land	Not rated		Not rated	
ToD:				
Toecane	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00
ToE:				
Toecane	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00
TrC:				
Toecane	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
	Large stones content	0.03	Large stones content	0.03
Tusquitee	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
	Gravel content	0.07	Gravel content	0.07
TsD:				
Toecane	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47
Tusquitee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47
	Gravel content	0.07	Gravel content	0.07

Table 12.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas		Picnic areas	
	Rating class and limiting features	Value	Rating class and limiting features	Value
TsE:				
Toecane	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47
Tusquitee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47
	Gravel content	0.07	Gravel content	0.07
TuD:				
Tusquitee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Gravel content	0.07	Gravel content	0.07
Toecane	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.03	Large stones content	0.03
TwB:				
Tusquitee	Not limited		Not limited	
Whiteside	Not limited		Not limited	
TwC:				
Tusquitee	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
Whiteside	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
UcB:				
Udifluvents	Very limited		Very limited	
	Flooding	1.00	Too sandy	1.00
	Too sandy	1.00	Flooding	0.40
Ud:				
Udorthents	Not limited		Not limited	
UfB:				
Udorthents	Very limited		Not limited	
	Flooding	1.00		
Urban land	Not rated		Not rated	
UhE:				
Udorthents	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Urban land	Not rated		Not rated	
UkE:				
Unaka	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47
Rock outcrop	Not rated		Not rated	

Table 12.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas		Picnic areas	
	Rating class and limiting features	Value	Rating class and limiting features	Value
UkF:				
Unaka	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47
Rock outcrop	Not rated		Not rated	
UrD:				
Unicoi	Very limited		Very limited	
	Slow water movement	1.00	Slow water movement	1.00
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Large stones content	0.47	Large stones content	0.47
Rock outcrop	Not rated		Not rated	
UsB:				
Unison	Not limited		Not limited	
UsC:				
Unison	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
UsD:				
Unison	Very limited		Very limited	
	Slope	1.00	Slope	1.00
W:				
Water	Not rated		Not rated	
WaC2:				
Walnut	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
Oteen	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Slope	0.63	Slope	0.63
Mars Hill	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
	Too sandy	0.01	Too sandy	0.01
WaD2:				
Walnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Oteen	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
Mars Hill	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Too sandy	0.01	Too sandy	0.01
WaE2:				
Walnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00

Table 12.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas		Picnic areas	
	Rating class and limiting features	Value	Rating class and limiting features	Value
WaE2:				
Oteen	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
Mars Hill	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Too sandy	0.01	Too sandy	0.01
WoF:				
Walnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Oteen	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
Rock outcrop	Not rated		Not rated	
WrC:				
Wayah	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
Burton	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
WrD:				
Wayah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Burton	Very limited		Very limited	
	Slope	1.00	Slope	1.00
WrE:				
Wayah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Burton	Very limited		Very limited	
	Slope	1.00	Slope	1.00
WsF:				
Wayah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Burton	Very limited		Very limited	
	Slope	1.00	Slope	1.00
WtB:				
Whiteside	Not limited		Not limited	

Table 12.—Recreational Development, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AcD:						
Ashe	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Large stones content	0.53	Large stones content	0.53	Depth to bedrock	0.46
	Depth to bedrock	0.46			Droughty	0.04
	Gravel content	0.02				
Cleveland	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Depth to bedrock	1.00	Large stones content	0.53	Droughty	1.00
	Gravel content	0.56			Depth to bedrock	1.00
	Large stones content	0.53				
Rock outcrop	Not rated		Not rated		Not rated	
ArE:						
Ashe	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47	Depth to bedrock	0.46
	Depth to bedrock	0.46			Droughty	0.04
	Gravel content	0.02				
Cleveland	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Large stones content	0.47	Droughty	1.00
	Gravel content	0.56			Depth to bedrock	1.00
	Large stones content	0.47				
Rock outcrop	Not rated		Not rated		Not rated	
ArF:						
Ashe	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47	Depth to bedrock	0.46
	Depth to bedrock	0.46			Droughty	0.04
	Gravel content	0.02				
Cleveland	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Large stones content	0.47	Droughty	1.00
	Gravel content	0.56			Depth to bedrock	1.00
	Large stones content	0.47				
Rock outcrop	Not rated		Not rated		Not rated	
BaA:						
Biltmore	Somewhat limited		Somewhat limited		Somewhat limited	
	Flooding	0.60	Too sandy	0.42	Flooding	0.60
	Too sandy	0.42			Droughty	0.09

Table 12.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BkB2:						
Braddock	Somewhat limited		Not limited		Not limited	
	Slope	0.88				
	Gravel content	0.32				
BkC2:						
Braddock	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.32				
BkD2:						
Braddock	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.32				
BnD:						
Buladean	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.04				
Chestnut	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Depth to bedrock	0.74			Depth to bedrock	0.74
	Gravel content	0.44			Droughty	0.71
BnE:						
Buladean	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.04				
Chestnut	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.74			Depth to bedrock	0.74
	Gravel content	0.44			Droughty	0.71
BnF:						
Buladean	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.04				
Chestnut	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.74			Depth to bedrock	0.74
	Gravel content	0.44			Droughty	0.71
CaD:						
Calvin	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	1.00			Large stones content	0.54
	Depth to bedrock	0.10			Droughty	0.12
					Depth to bedrock	0.10
					Gravel content	0.04

Table 12.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CaE:						
Calvin	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	1.00			Large stones content	0.54
	Depth to bedrock	0.10			Droughty	0.12
					Depth to bedrock	0.10
					Gravel content	0.04
CaF:						
Calvin	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	1.00			Large stones content	0.54
	Depth to bedrock	0.10			Droughty	0.12
					Depth to bedrock	0.10
					Gravel content	0.04
CfF:						
Cataska	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Large stones content	0.53	Droughty	1.00
	Gravel content	1.00			Depth to bedrock	1.00
	Large stones content	0.53			Large stones content	0.54
					Gravel content	0.04
Sylco	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	1.00	Large stones content	0.53	Gravel content	1.00
	Large stones content	0.53			Depth to bedrock	0.46
	Depth to bedrock	0.46			Droughty	0.45
					Large stones content	0.01
Rock outcrop	Not rated		Not rated		Not rated	
ChD:						
Cheoah	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
Jeffrey	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Large stones content	0.53	Large stones content	0.53	Depth to bedrock	0.35
	Depth to bedrock	0.35				
ChE:						
Cheoah	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Jeffrey	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53	Depth to bedrock	0.35
	Depth to bedrock	0.35				

Table 12.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
ChF:						
Cheoah------------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Jeffrey-----------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53	Depth to bedrock	0.35
	Depth to bedrock	0.35				
CsD:						
Chestoa-----------------	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Depth to bedrock	0.80			Depth to bedrock	0.80
	Gravel content	0.44			Droughty	0.11
CsE:						
Chestoa-----------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.80			Depth to bedrock	0.80
	Gravel content	0.44			Droughty	0.11
CsF:						
Chestoa-----------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.80			Depth to bedrock	0.80
	Gravel content	0.44			Droughty	0.11
CtB2:						
Clifton-----------------	Somewhat limited		Not limited		Not limited	
	Slope	0.88				
	Gravel content	0.04				
CtC2:						
Clifton-----------------	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.04				
CtD2:						
Clifton-----------------	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.04				
CtE2:						
Clifton-----------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.04				
CxC:						
Clifton-----------------	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.04				
Urban land--------------	Not rated		Not rated		Not rated	

Table 12.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
DeA:						
Dellwood	Very limited		Not limited		Somewhat limited	
	Gravel content	1.00			Droughty	0.99
	Flooding	0.60			Flooding	0.60
					Gravel content	0.06
					Large stones content	0.03
Reddies	Somewhat limited		Not limited		Somewhat limited	
	Flooding	0.60			Flooding	0.60
	Gravel content	0.27			Droughty	0.01
DrB:						
Dillard	Somewhat limited		Not limited		Not limited	
	Slope	0.12				
DtD:						
Ditney	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Large stones content	0.53	Large stones content	0.53	Depth to bedrock	0.46
	Depth to bedrock	0.46			Droughty	0.02
	Gravel content	0.04				
Unicoi	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Depth to bedrock	1.00	Large stones content	0.53	Droughty	1.00
	Gravel content	0.95			Depth to bedrock	1.00
	Large stones content	0.53			Large stones content	0.61
DuE:						
Ditney	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53	Depth to bedrock	0.46
	Depth to bedrock	0.46			Droughty	0.02
	Gravel content	0.04				
Unicoi	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Large stones content	0.53	Droughty	1.00
	Gravel content	0.95			Depth to bedrock	1.00
	Large stones content	0.53			Large stones content	0.61
DuF:						
Ditney	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53	Depth to bedrock	0.46
	Depth to bedrock	0.46			Droughty	0.02
	Gravel content	0.04				
Unicoi	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Large stones content	0.53	Droughty	1.00
	Gravel content	1.00			Depth to bedrock	1.00
	Large stones content	0.53			Large stones content	0.46
					Gravel content	0.01

Table 12.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
EdD:						
Edneyville	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.59				
Chestnut	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.99			Large stones content	0.20
	Depth to bedrock	0.06			Droughty	0.08
					Depth to bedrock	0.06
EdE:						
Edneyville	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.59				
Chestnut	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.99			Large stones content	0.20
	Depth to bedrock	0.06			Droughty	0.08
					Depth to bedrock	0.06
EdF:						
Edneyville	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.59				
Chestnut	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.99			Large stones content	0.20
	Depth to bedrock	0.06			Droughty	0.08
					Depth to bedrock	0.06
EfA:						
Ela, drained	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Ponding	1.00
	Flooding	1.00	Ponding	1.00	Flooding	1.00
	Ponding	1.00	Flooding	0.40	Depth to saturated zone	1.00
	Gravel content	0.27				
Ela, undrained	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Ponding	1.00
	Flooding	1.00	Ponding	1.00	Flooding	1.00
	Ponding	1.00	Flooding	0.40	Depth to saturated zone	1.00
	Gravel content	0.01				
EvD2:						
Evard	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.13				
Cowee	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Depth to bedrock	0.74			Depth to bedrock	0.74
	Gravel content	0.13			Droughty	0.01

Table 12.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
EvE2:						
Evard	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.13				
Cowee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.74			Depth to bedrock	0.74
	Gravel content	0.13			Droughty	0.01
EvF2:						
Evard	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.13				
Cowee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.74			Depth to bedrock	0.74
	Gravel content	0.13			Droughty	0.01
EwD:						
Evard	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.04				
Cowee	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.05			Depth to bedrock	0.01
	Depth to bedrock	0.01				
EwE:						
Evard	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.04				
Cowee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.01			Depth to bedrock	0.01
EwF:						
Evard	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.04				
Cowee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.01			Depth to bedrock	0.01
FnD2:						
Fannin	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.04			Large stones content	0.01
FrA:						
French	Somewhat limited		Somewhat limited		Somewhat limited	
	Depth to saturated zone	0.81	Depth to saturated zone	0.11	Flooding	0.60
	Flooding	0.60			Depth to saturated zone	0.48
					Large stones content	0.01

Table 12.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
HcE:						
Heintooga---------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.99	Large stones content	0.99	Large stones content	0.99
	Gravel content	0.03	Large stones content	0.53		
Chiltoskie--------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53	Large stones content	0.01
HpA:						
Hemphill, drained-------	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Slow water movement	0.96				
Hemphill, undrained-----	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Ponding	1.00
	Ponding	1.00	Ponding	1.00	Depth to saturated zone	1.00
	Slow water movement	0.96				
JbD:						
Junaluska---------------	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Slow water movement	0.26			Depth to bedrock	0.06
	Depth to bedrock	0.06				
Brasstown---------------	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
					Large stones content	0.03
JbE:						
Junaluska---------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Slow water movement	0.26			Depth to bedrock	0.06
	Depth to bedrock	0.06				
Brasstown---------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.03
JbF:						
Junaluska---------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Slow water movement	0.26			Depth to bedrock	0.06
	Depth to bedrock	0.06				

Table 12.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
JbF:						
Brasstown----------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.03
KnC:						
Keener------------------	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
MwC:						
Mars Hill---------------	Very limited		Somewhat limited		Somewhat limited	
	Slope	1.00	Too sandy	0.01	Slope	0.63
	Gravel content	0.04				
	Too sandy	0.01				
Walnut------------------	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Depth to bedrock	0.74
	Depth to bedrock	0.74			Slope	0.63
	Gravel content	0.04			Droughty	0.07
MwD:						
Mars Hill---------------	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.04	Too sandy	0.01		
	Too sandy	0.01				
Walnut------------------	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Depth to bedrock	0.74			Depth to bedrock	0.74
	Gravel content	0.04			Droughty	0.07
MwE:						
Mars Hill---------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.04	Too sandy	0.01		
	Too sandy	0.01				
Walnut------------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.74			Depth to bedrock	0.74
	Gravel content	0.04			Droughty	0.08
MwF:						
Mars Hill---------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.04	Too sandy	0.01		
	Too sandy	0.01				
Walnut------------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.74			Depth to bedrock	0.74
	Gravel content	0.04			Droughty	0.07
MyB:						
Maymead-----------------	Somewhat limited		Not limited		Not limited	
	Slope	0.88				
	Gravel content	0.04				

Table 12.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MyB:						
Northcove	Somewhat limited		Somewhat limited		Very limited	
	Slope	0.88	Large stones content	0.42	Large stones content	1.00
	Gravel content	0.76			Droughty	0.09
	Large stones content	0.42				
NhC:						
Northcove	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Large stones content	0.42	Large stones content	1.00
	Gravel content	0.76			Slope	0.63
	Large stones content	0.42			Droughty	0.09
Maymead	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.04				
NtD:						
Northcove	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.76	Large stones content	0.53	Large stones content	1.00
	Large stones content	0.53			Droughty	0.09
Maymead	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Large stones content	0.53	Large stones content	0.53		
	Gravel content	0.04				
NtE:						
Northcove	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.76	Large stones content	0.53	Large stones content	1.00
	Large stones content	0.53			Droughty	0.09
Maymead	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53		
	Gravel content	0.04				
OwC:						
Oconaluftee	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Large stones content	0.46
	Gravel content	1.00			Slope	0.37
					Gravel content	0.21
Guyot	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.37
					Large stones content	0.01

Table 12.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
OwC:						
Cataloochee	Very limited		Not limited		Very limited	
	Slope	1.00			Too acid	1.00
	Too acid	1.00			Slope	0.37
	Depth to bedrock	0.35			Depth to bedrock	0.35
	Gravel content	0.01			Large stones content	0.11
OwD:						
Oconaluftee	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	1.00			Large stones content	0.46
					Gravel content	0.21
Guyot	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
					Large stones content	0.01
Cataloochee	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Too acid	1.00			Too acid	1.00
	Depth to bedrock	0.35			Depth to bedrock	0.35
	Gravel content	0.01			Large stones content	0.11
OwE:						
Oconaluftee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	1.00			Large stones content	0.46
					Gravel content	0.21
Guyot	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.01
Cataloochee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Too acid	1.00			Too acid	1.00
	Depth to bedrock	0.35			Depth to bedrock	0.35
	Gravel content	0.01			Large stones content	0.11
OwF:						
Oconaluftee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	1.00			Large stones content	0.46
					Gravel content	0.21
Guyot	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.01

Table 12.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
OwF:						
Cataloochee	Very limited Slope Too acid Depth to bedrock Gravel content	 1.00 1.00 0.35 0.01	Very limited Slope	 1.00	Very limited Slope Too acid Depth to bedrock Large stones content	 1.00 1.00 0.35 0.11
PwC:						
Porters	Very limited Slope Gravel content	 1.00 0.56	Not limited		Somewhat limited Slope	 0.63
Unaka	Very limited Slope Depth to bedrock Gravel content	 1.00 0.71 0.22	Not limited		Somewhat limited Depth to bedrock Slope	 0.71 0.63
PwD:						
Porters	Very limited Slope Gravel content	 1.00 0.56	Somewhat limited Slope	 0.92	Very limited Slope	 1.00
Unaka	Very limited Slope Depth to bedrock Gravel content	 1.00 0.71 0.22	Somewhat limited Slope	 0.92	Very limited Slope Depth to bedrock	 1.00 0.71
PwE:						
Porters	Very limited Slope Gravel content	 1.00 0.56	Very limited Slope	 1.00	Very limited Slope	 1.00
Unaka	Very limited Slope Depth to bedrock Gravel content	 1.00 0.71 0.22	Very limited Slope	 1.00	Very limited Slope Depth to bedrock	 1.00 0.71
PxF:						
Porters	Very limited Slope Gravel content	 1.00 0.56	Very limited Slope	 1.00	Very limited Slope	 1.00
Unaka	Very limited Slope Depth to bedrock Gravel content	 1.00 0.71 0.22	Very limited Slope	 1.00	Very limited Slope Depth to bedrock	 1.00 0.71
RbA:						
Reddies	Somewhat limited Flooding Gravel content	 0.60 0.27	Not limited		Somewhat limited Flooding Droughty	 0.60 0.01

Table 12.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
RcF:						
Rock outcrop	Not rated		Not rated		Not rated	
Cataska	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00			Droughty	1.00
	Gravel content	1.00			Depth to bedrock	1.00
					Large stones content	0.74
					Gravel content	0.14
RhD:						
Rock outcrop	Not rated		Not rated		Not rated	
Chestoa	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Large stones content	0.47	Slope	1.00
	Depth to bedrock	0.80			Depth to bedrock	0.80
	Large stones content	0.47	Slope	0.32	Droughty	0.11
	Gravel content	0.44				
RhF:						
Rock outcrop	Not rated		Not rated		Not rated	
Chestoa	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.80	Large stones content	0.47	Depth to bedrock	0.80
	Large stones content	0.47			Droughty	0.11
	Gravel content	0.44				
RkF:						
Rock outcrop	Not rated		Not rated		Not rated	
Cleveland	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Large stones content	0.53	Droughty	1.00
	Gravel content	0.56			Depth to bedrock	1.00
	Large stones content	0.53				
RoF:						
Rock outcrop	Not rated		Not rated		Not rated	
Oteen	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Large stones content	0.47	Depth to bedrock	1.00
	Large stones content	0.47			Droughty	1.00
	Gravel content	0.04				

Table 12.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
RpF:						
Rock outcrop	Not rated		Not rated		Not rated	
Unicoi	Very limited		Very limited		Very limited	
	Slow water movement	1.00	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00	Droughty	1.00
	Slope	1.00			Depth to bedrock	1.00
	Depth to bedrock	1.00			Large stones content	0.61
	Gravel content	0.95				
RsA:						
Rosman	Somewhat limited		Not limited		Somewhat limited	
	Flooding	0.60			Flooding	0.60
SoD:						
Soco	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Slow water movement	0.26			Depth to bedrock	0.10
	Depth to bedrock	0.10				
Stecoah	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
SoE:						
Soco	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Slow water movement	0.26			Depth to bedrock	0.10
	Depth to bedrock	0.10				
Stecoah	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
SoF:						
Soco	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Slow water movement	0.26			Depth to bedrock	0.10
	Depth to bedrock	0.10				
Stecoah	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
StB:						
Statler	Somewhat limited		Not limited		Not limited	
	Gravel content	0.32				
	Slope	0.12				
SwD:						
Sylco	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.99	Large stones content	0.53	Large stones content	1.00
	Large stones content	0.53			Depth to bedrock	0.46
	Depth to bedrock	0.46			Droughty	0.09

Table 12.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SwD:						
Cataska	Very limited Slope Depth to bedrock Gravel content Large stones content	 1.00 1.00 0.72 0.53	Somewhat limited Slope Large stones content	 0.92 0.53	Very limited Slope Droughty Depth to bedrock Large stones content	 1.00 1.00 1.00 1.00
SwE:						
Sylco	Very limited Slope Gravel content Large stones content Depth to bedrock	 1.00 0.99 0.53 0.46	Very limited Slope Large stones content	 1.00 0.53	Very limited Slope Large stones content Depth to bedrock Droughty	 1.00 1.00 0.46 0.09
Cataska	Very limited Slope Depth to bedrock Gravel content Large stones content	 1.00 1.00 0.72 0.53	Very limited Slope Large stones content	 1.00 0.53	Very limited Slope Droughty Depth to bedrock Large stones content	 1.00 1.00 1.00 1.00
SyD:						
Sylco	Very limited Slope Gravel content Depth to bedrock	 1.00 0.99 0.46	Somewhat limited Slope	 0.92	Very limited Slope Depth to bedrock Droughty Large stones content	 1.00 0.46 0.41 0.20
Soco	Very limited Slope Gravel content Depth to bedrock	 1.00 0.22 0.10	Somewhat limited Slope	 0.92	Very limited Slope Large stones content Depth to bedrock	 1.00 0.92 0.10
SyE:						
Sylco	Very limited Slope Gravel content Depth to bedrock	 1.00 0.99 0.46	Very limited Slope	 1.00	Very limited Slope Depth to bedrock Droughty Large stones content	 1.00 0.46 0.41 0.20
Soco	Very limited Slope Gravel content Depth to bedrock	 1.00 0.22 0.10	Very limited Slope	 1.00	Very limited Slope Large stones content Depth to bedrock	 1.00 0.92 0.10
SzF:						
Sylco	Very limited Slope Gravel content Large stones content Depth to bedrock	 1.00 0.99 0.53 0.46	Very limited Slope Large stones content	 1.00 0.53	Very limited Slope Depth to bedrock Droughty Large stones content	 1.00 0.46 0.41 0.20

Table 12.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SzF:						
Soco	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53	Large stones content	0.92
	Gravel content	0.22			Depth to bedrock	0.10
	Depth to bedrock	0.10				
TaB:						
Tate	Somewhat limited		Not limited		Not limited	
	Slope	0.88				
	Gravel content	0.04				
TaC:						
Tate	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.04				
TaD:						
Tate	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.04				
TkC:						
Tate	Very limited		Somewhat limited		Somewhat limited	
	Slope	1.00	Large stones content	0.53	Slope	0.63
	Large stones content	0.53				
	Gravel content	0.04				
TkD:						
Tate	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Large stones content	0.53	Large stones content	0.53		
	Gravel content	0.04				
TmC:						
Tate	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.04
	Gravel content	0.04				
Urban land	Not rated		Not rated		Not rated	
ToD:						
Toecane	Very limited		Very limited		Very limited	
	Large stones content	1.00	Large stones content	1.00	Slope	1.00
	Slope	1.00	Slope	0.92	Large stones content	1.00
	Gravel content	0.62			Droughty	0.07
ToE:						
Toecane	Very limited		Very limited		Very limited	
	Large stones content	1.00	Slope	1.00	Slope	1.00
	Slope	1.00	Large stones content	1.00	Large stones content	1.00
	Gravel content	0.62			Droughty	0.07

Table 12.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
TrC:						
Toecane	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Large stones content	0.03	Large stones content	1.00
	Gravel content	0.31			Slope	0.63
	Large stones content	0.03			Droughty	0.07
Tusquitee	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	1.00			Large stones content	0.20
					Gravel content	0.07
TsD:						
Toecane	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Large stones content	0.47	Large stones content	0.47	Large stones content	1.00
	Gravel content	0.31			Droughty	0.07
Tusquitee	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	1.00	Large stones content	0.47	Large stones content	0.20
	Large stones content	0.47			Gravel content	0.07
TsE:						
Toecane	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47	Large stones content	1.00
	Gravel content	0.31			Droughty	0.07
Tusquitee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	1.00	Large stones content	0.47	Large stones content	0.20
	Large stones content	0.47			Gravel content	0.07
TuD:						
Tusquitee	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	1.00			Large stones content	0.20
					Gravel content	0.07
Toecane	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.31	Large stones content	0.03	Large stones content	1.00
	Large stones content	0.03			Droughty	0.07
TwB:						
Tusquitee	Somewhat limited		Not limited		Not limited	
	Slope	0.88				
	Gravel content	0.04				

Table 12.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
TwB:						
Whiteside	Somewhat limited		Not limited		Not limited	
	Slope	0.88				
	Gravel content	0.37				
TwC:						
Tusquitee	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.04				
Whiteside	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.37				
UcB:						
Udifluvents	Very limited		Very limited		Very limited	
	Too sandy	1.00	Too sandy	1.00	Flooding	1.00
	Flooding	1.00	Flooding	0.40	Too sandy	0.50
	Slope	0.12			Droughty	0.34
	Gravel content	0.01				
Ud:						
Udorthents	Very limited		Not limited		Not limited	
	Slope	1.00				
UfB:						
Udorthents	Somewhat limited		Not limited		Somewhat limited	
	Flooding	0.60			Flooding	0.60
	Slope	0.12				
Urban land	Not rated		Not rated		Not rated	
UhE:						
Udorthents	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Urban land	Not rated		Not rated		Not rated	
UkE:						
Unaka	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.71	Large stones content	0.47	Depth to bedrock	0.71
	Large stones content	0.47				
	Gravel content	0.22				
Rock outcrop	Not rated		Not rated		Not rated	
UkF:						
Unaka	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.71	Large stones content	0.47	Depth to bedrock	0.71
	Large stones content	0.47				
	Gravel content	0.22				
Rock outcrop	Not rated		Not rated		Not rated	

Table 12.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
UrD:						
Unicoi	Very limited		Somewhat limited		Very limited	
	Slow water movement	1.00	Large stones content	0.47	Droughty	1.00
					Depth to bedrock	1.00
	Slope	1.00	Slope	0.32	Slope	1.00
	Depth to bedrock	1.00			Large stones content	0.61
	Gravel content	0.95				
	Large stones content	0.47				
Rock outcrop	Not rated		Not rated		Not rated	
UsB:						
Unison	Somewhat limited		Not limited		Somewhat limited	
	Slope	0.88			Large stones content	0.01
UsC:						
Unison	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
					Large stones content	0.01
UsD:						
Unison	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
					Large stones content	0.01
W:						
Water	Not rated		Not rated		Not rated	
WaC2:						
Walnut	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Depth to bedrock	0.74
	Depth to bedrock	0.74			Slope	0.63
	Gravel content	0.04			Droughty	0.21
Oteen	Very limited		Not limited		Very limited	
	Slope	1.00			Depth to bedrock	1.00
	Depth to bedrock	1.00			Droughty	1.00
	Gravel content	0.04			Slope	0.63
Mars Hill	Very limited		Somewhat limited		Somewhat limited	
	Slope	1.00	Too sandy	0.01	Slope	0.63
	Gravel content	0.04				
	Too sandy	0.01				
WaD2:						
Walnut	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Depth to bedrock	0.74			Depth to bedrock	0.74
	Gravel content	0.04			Droughty	0.21
Oteen	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Depth to bedrock	1.00			Depth to bedrock	1.00
	Gravel content	0.04			Droughty	1.00

Table 12.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
WaD2:						
Mars Hill	Very limited Slope Gravel content Too sandy	 1.00 0.04 0.01	Somewhat limited Slope Too sandy	 0.92 0.01	Very limited Slope	 1.00
WaE2:						
Walnut	Very limited Slope Depth to bedrock Gravel content	 1.00 0.74 0.04	Very limited Slope	 1.00	Very limited Slope Depth to bedrock Droughty	 1.00 0.74 0.21
Oteen	Very limited Slope Depth to bedrock Gravel content	 1.00 1.00 0.04	Very limited Slope	 1.00	Very limited Slope Depth to bedrock Droughty	 1.00 1.00 1.00
Mars Hill	Very limited Slope Gravel content Too sandy	 1.00 0.04 0.01	Very limited Slope Too sandy	 1.00 0.01	Very limited Slope	 1.00
WoF:						
Walnut	Very limited Slope Depth to bedrock Gravel content	 1.00 0.74 0.04	Very limited Slope	 1.00	Very limited Slope Depth to bedrock Droughty	 1.00 0.74 0.08
Oteen	Very limited Slope Depth to bedrock Gravel content	 1.00 1.00 0.04	Very limited Slope	 1.00	Very limited Slope Depth to bedrock Droughty	 1.00 1.00 1.00
Rock outcrop	Not rated		Not rated		Not rated	
WrC:						
Wayah	Very limited Slope Gravel content	 1.00 0.66	Not limited		Somewhat limited Slope Large stones content	 0.63 0.01
Burton	Very limited Slope Depth to bedrock Gravel content	 1.00 0.84 0.51	Not limited		Somewhat limited Depth to bedrock Slope Large stones content	 0.84 0.63 0.16
WrD:						
Wayah	Very limited Slope Gravel content	 1.00 0.66	Somewhat limited Slope	 0.92	Very limited Slope Large stones content	 1.00 0.01
Burton	Very limited Slope Depth to bedrock Gravel content	 1.00 0.84 0.51	Somewhat limited Slope	 0.92	Very limited Slope Depth to bedrock Large stones content	 1.00 0.84 0.16

Table 12.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
WrE:						
Wayah	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.66			Large stones content	0.01
Burton	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.84			Depth to bedrock	0.84
	Gravel content	0.51			Large stones content	0.16
WsF:						
Wayah	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.66			Large stones content	0.01
Burton	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.84			Depth to bedrock	0.84
	Gravel content	0.51			Large stones content	0.16
WtB:						
Whiteside	Somewhat limited		Not limited		Not limited	
	Slope	0.88				
	Gravel content	0.27				

Table 13.—Building Site Development, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AcD:						
Ashe	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	0.46	Depth to hard bedrock	1.00	Depth to bedrock	0.46
					Droughty	0.04
Cleveland	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Droughty	1.00
					Depth to bedrock	1.00
Rock outcrop	Not rated		Not rated		Not rated	
ArE:						
Ashe	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	0.46	Depth to hard bedrock	1.00	Depth to bedrock	0.46
					Droughty	0.04
Cleveland	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Droughty	1.00
					Depth to bedrock	1.00
Rock outcrop	Not rated		Not rated		Not rated	
ArF:						
Ashe	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	0.46	Depth to hard bedrock	1.00	Depth to bedrock	0.46
					Droughty	0.04
Cleveland	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Droughty	1.00
					Depth to bedrock	1.00
Rock outcrop	Not rated		Not rated		Not rated	
BaA:						
Biltmore	Very limited		Very limited		Somewhat limited	
	Flooding	1.00	Flooding	1.00	Flooding	0.60
			Depth to saturated zone	0.24	Droughty	0.09
BkB2:						
Braddock	Somewhat limited		Somewhat limited		Not limited	
	Shrink-swell	0.50	Shrink-swell	0.50		
BkC2:						
Braddock	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63	Slope	0.63
	Shrink-swell	0.50	Shrink-swell	0.50		

Table 13.—Building Site Development, Part I—Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BkD2:						
Braddock	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Shrink-swell	0.50	Shrink-swell	0.50		
BnD:						
Buladean	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Chestnut	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.74	Depth to bedrock	0.74
					Droughty	0.71
BnE:						
Buladean	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Chestnut	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.74	Depth to bedrock	0.74
					Droughty	0.71
BnF:						
Buladean	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Chestnut	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.74	Depth to bedrock	0.74
					Droughty	0.71
CaD:						
Calvin	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.71	Large stones content	0.71	Large stones content	0.54
			Depth to soft bedrock	0.10	Droughty	0.12
					Depth to bedrock	0.10
					Gravel content	0.04
CaE:						
Calvin	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.71	Large stones content	0.71	Large stones content	0.54
			Depth to soft bedrock	0.10	Droughty	0.12
					Depth to bedrock	0.10
					Gravel content	0.04
CaF:						
Calvin	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.71	Large stones content	0.71	Large stones content	0.54
			Depth to soft bedrock	0.10	Droughty	0.12
					Depth to bedrock	0.10
					Gravel content	0.04

Table 13.—Building Site Development, Part I—Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CfF:						
Cataska	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	0.64	Depth to hard bedrock	1.00	Droughty	1.00
	Depth to soft bedrock	0.50	Depth to soft bedrock	1.00	Depth to bedrock	1.00
					Large stones content	0.54
					Gravel content	0.04
Sylco	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	0.46	Depth to hard bedrock	1.00	Gravel content	1.00
					Depth to bedrock	0.46
					Droughty	0.45
					Large stones content	0.01
Rock outcrop	Not rated		Not rated		Not rated	
ChD:						
Cheoah	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Jeffrey	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	0.35	Depth to hard bedrock	1.00	Depth to bedrock	0.35
ChE:						
Cheoah	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Jeffrey	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	0.35	Depth to hard bedrock	1.00	Depth to bedrock	0.35
ChF:						
Cheoah	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Jeffrey	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	0.35	Depth to hard bedrock	1.00	Depth to bedrock	0.35
CsD:						
Chestoa	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	0.79	Depth to hard bedrock	1.00	Depth to bedrock	0.80
					Droughty	0.11
CsE:						
Chestoa	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	0.79	Depth to hard bedrock	1.00	Depth to bedrock	0.80
					Droughty	0.11

Table 13.—Building Site Development, Part I—Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CsF:						
Chestoa	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	0.79	Depth to hard bedrock	1.00	Depth to bedrock	0.80
					Droughty	0.11
CtB2:						
Clifton	Somewhat limited		Somewhat limited		Not limited	
	Shrink-swell	0.50	Shrink-swell	0.50		
CtC2:						
Clifton	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63	Slope	0.63
	Shrink-swell	0.50	Shrink-swell	0.50		
CtD2:						
Clifton	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Shrink-swell	0.50	Shrink-swell	0.50		
CtE2:						
Clifton	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Shrink-swell	0.50	Shrink-swell	0.50		
CxC:						
Clifton	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63	Slope	0.63
	Shrink-swell	0.50	Shrink-swell	0.50		
Urban land	Not rated		Not rated		Not rated	
DeA:						
Dellwood	Very limited		Very limited		Somewhat limited	
	Flooding	1.00	Flooding	1.00	Droughty	0.99
	Large stones content	0.02	Depth to saturated zone	0.95	Flooding	0.60
			Large stones content	0.02	Gravel content	0.06
					Large stones content	0.03
Reddies	Very limited		Very limited		Somewhat limited	
	Flooding	1.00	Flooding	1.00	Flooding	0.60
			Depth to saturated zone	0.99	Droughty	0.01
DrB:						
Dillard	Very limited		Very limited		Not limited	
	Flooding	1.00	Flooding	1.00		
			Depth to saturated zone	0.99		
DtD:						
Ditney	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	0.46	Depth to hard bedrock	1.00	Depth to bedrock	0.46
					Droughty	0.02

Table 13.—Building Site Development, Part I—Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
DtD:						
Unicoi	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Droughty	1.00
					Depth to bedrock	1.00
	Large stones content	0.10	Large stones content	0.10	Large stones content	0.61
DuE:						
Ditney	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	0.46	Depth to hard bedrock	1.00	Depth to bedrock	0.46
					Droughty	0.02
Unicoi	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Droughty	1.00
					Depth to bedrock	1.00
	Large stones content	0.10	Large stones content	0.10	Large stones content	0.61
DuF:						
Ditney	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	0.46	Depth to hard bedrock	1.00	Depth to bedrock	0.46
					Droughty	0.02
Unicoi	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Droughty	1.00
					Depth to bedrock	1.00
	Large stones content	0.01	Large stones content	0.01	Large stones content	0.46
					Gravel content	0.01
EdD:						
Edneyville	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Chestnut	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.06	Large stones content	0.20
					Droughty	0.08
					Depth to bedrock	0.06
EdE:						
Edneyville	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Chestnut	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.06	Large stones content	0.20
					Droughty	0.08
					Depth to bedrock	0.06

Table 13.—Building Site Development, Part I—Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
EdF:						
Edneyville	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Chestnut	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.06	Large stones content	0.20
					Droughty	0.08
					Depth to bedrock	0.06
EfA:						
Ela	Very limited		Very limited		Very limited	
	Ponding	1.00	Ponding	1.00	Ponding	1.00
	Flooding	1.00	Flooding	1.00	Flooding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
EvD2:						
Evard	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Cowee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.74	Depth to bedrock	0.74
					Droughty	0.01
EvE2:						
Evard	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Cowee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.74	Depth to bedrock	0.74
					Droughty	0.01
EvF2:						
Evard	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Cowee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.74	Depth to bedrock	0.74
					Droughty	0.01
EwD:						
Evard	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Cowee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.01	Depth to bedrock	0.01
EwE:						
Evard	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00

Table 13.—Building Site Development, Part I—Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
EwE:						
Cowee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.01	Depth to bedrock	0.01
EwF:						
Evard	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Cowee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.01	Depth to bedrock	0.01
FnD2:						
Fannin	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.01
FrA:						
French	Very limited		Very limited		Somewhat limited	
	Flooding	1.00	Flooding	1.00	Flooding	0.60
	Depth to saturated zone	0.81	Depth to saturated zone	1.00	Depth to saturated zone	0.48
					Large stones content	0.01
HcE:						
Heintooga	Very limited		Very limited		Not rated	
	Slope	1.00	Slope	1.00		
	Large stones content	1.00	Large stones content	1.00		
Chiltoskie	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.01
HpA:						
Hemphill, drained	Very limited		Very limited		Very limited	
	Flooding	1.00	Flooding	1.00	Depth to saturated zone	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00		
Hemphill, undrained	Very limited		Very limited		Very limited	
	Ponding	1.00	Ponding	1.00	Ponding	1.00
	Flooding	1.00	Flooding	1.00	Depth to saturated zone	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00		
JbD:						
Junaluska	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.06	Depth to bedrock	0.06

Table 13.—Building Site Development, Part I—Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
JbD:						
Brasstown---------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.03
JbE:						
Junaluska---------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.06	Depth to bedrock	0.06
Brasstown---------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.03
JbF:						
Junaluska---------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.06	Depth to bedrock	0.06
Brasstown---------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.03
KnC:						
Keener------------------	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63	Slope	0.63
MwC:						
Mars Hill---------------	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63	Slope	0.63
Walnut------------------	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	0.63	Depth to soft bedrock	0.74	Depth to bedrock	0.74
					Slope	0.63
			Slope	0.63	Droughty	0.07
MwD:						
Mars Hill---------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Walnut------------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.74	Depth to bedrock	0.74
					Droughty	0.07
MwE:						
Mars Hill---------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Walnut------------------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.74	Depth to bedrock	0.74
					Droughty	0.08

Table 13.—Building Site Development, Part I—Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MwF:						
Mars Hill	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Walnut	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.74	Depth to bedrock	0.74
					Droughty	0.07
MyB:						
Maymead	Not limited		Not limited		Not limited	
Northcove	Very limited		Very limited		Very limited	
	Large stones content	1.00	Large stones content	1.00	Large stones content	1.00
					Droughty	0.09
NhC:						
Northcove	Very limited		Very limited		Very limited	
	Large stones content	1.00	Large stones content	1.00	Large stones content	1.00
	Slope	0.63	Slope	0.63	Slope	0.63
					Droughty	0.09
Maymead	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63	Slope	0.63
NtD:						
Northcove	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00	Large stones content	1.00
					Droughty	0.09
Maymead	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
NtE:						
Northcove	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00	Large stones content	1.00
					Droughty	0.09
Maymead	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
OwC:						
Oconaluftee	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	0.37	Slope	0.37	Large stones content	0.46
					Slope	0.37
					Gravel content	0.21
Guyot	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	0.37	Slope	0.37	Slope	0.37
					Large stones content	0.01

Table 13.—Building Site Development, Part I—Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
OwC:						
Cataloochee	Somewhat limited		Somewhat limited		Very limited	
	Slope	0.37	Slope	0.37	Too acid	1.00
			Depth to soft bedrock	0.35	Slope	0.37
					Depth to bedrock	0.35
					Large stones content	0.11
OwD:						
Oconaluftee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.46
					Gravel content	0.21
Guyot	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.01
Cataloochee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.35	Too acid	1.00
					Depth to bedrock	0.35
					Large stones content	0.11
OwE:						
Oconaluftee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.46
					Gravel content	0.21
Guyot	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.01
Cataloochee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.35	Too acid	1.00
					Depth to bedrock	0.35
					Large stones content	0.11
OwF:						
Oconaluftee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.46
					Gravel content	0.21
Guyot	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.01

Table 13.—Building Site Development, Part I—Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
OwF:						
Cataloochee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.35	Too acid	1.00
					Depth to bedrock	0.35
					Large stones content	0.11
PwC:						
Porters	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63	Slope	0.63
			Depth to hard bedrock	0.13		
Unaka	Somewhat limited		Very limited		Somewhat limited	
	Slope	0.63	Depth to hard bedrock	1.00	Depth to bedrock	0.71
	Depth to hard bedrock	0.35	Depth to soft bedrock	0.71	Slope	0.63
			Slope	0.63		
PwD:						
Porters	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to hard bedrock	0.13		
Unaka	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	0.35	Depth to hard bedrock	1.00	Depth to bedrock	0.71
			Depth to soft bedrock	0.71		
PwE:						
Porters	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to hard bedrock	0.13		
Unaka	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	0.35	Depth to hard bedrock	1.00	Depth to bedrock	0.71
			Depth to soft bedrock	0.71		
PxF:						
Porters	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to hard bedrock	0.13		
Unaka	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	0.35	Depth to hard bedrock	1.00	Depth to bedrock	0.71
			Depth to soft bedrock	0.71		

Table 13.—Building Site Development, Part I—Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
RbA:						
Reddies	Very limited		Very limited		Somewhat limited	
	Flooding	1.00	Flooding	1.00	Flooding	0.60
			Depth to saturated zone	0.99	Droughty	0.01
RcF:						
Rock outcrop	Not rated		Not rated		Not rated	
Cataska	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	0.64	Depth to hard bedrock	1.00	Droughty	1.00
	Depth to soft bedrock	0.50	Depth to soft bedrock	1.00	Depth to bedrock	1.00
					Large stones content	0.74
					Gravel content	0.14
RhD:						
Rock outcrop	Not rated		Not rated		Not rated	
Chestoa	Very limited		Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
	Depth to hard bedrock	0.79	Slope	1.00	Depth to bedrock	0.80
					Droughty	0.11
RhF:						
Rock outcrop	Not rated		Not rated		Not rated	
Chestoa	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	0.79	Depth to hard bedrock	1.00	Depth to bedrock	0.80
					Droughty	0.11
RkF:						
Rock outcrop	Not rated		Not rated		Not rated	
Cleveland	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Droughty	1.00
					Depth to bedrock	1.00
RoF:						
Rock outcrop	Not rated		Not rated		Not rated	
Oteen	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to soft bedrock	0.50	Depth to soft bedrock	1.00	Depth to bedrock	1.00
					Droughty	1.00
RpF:						
Rock outcrop	Not rated		Not rated		Not rated	
Unicoi	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Droughty	1.00
	Large stones content	0.01	Large stones content	0.01	Depth to bedrock	1.00
					Large stones content	0.61

Table 13.—Building Site Development, Part I—Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
RsA:						
Rosman	Very limited		Very limited		Somewhat limited	
	Flooding	1.00	Flooding	1.00	Flooding	0.60
			Depth to saturated zone	0.47		
SoD:						
Soco	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.10	Depth to bedrock	0.10
Stecoah	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
SoE:						
Soco	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.10	Depth to bedrock	0.10
Stecoah	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
SoF:						
Soco	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.10	Depth to bedrock	0.10
Stecoah	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
StB:						
Statler	Very limited		Very limited		Not limited	
	Flooding	1.00	Flooding	1.00		
			Depth to saturated zone	0.16		
SwD:						
Sylco	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.97	Depth to hard bedrock	1.00	Large stones content	1.00
	Depth to hard bedrock	0.46	Large stones content	0.97	Depth to bedrock	0.46
					Droughty	0.09
Cataska	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.98	Depth to hard bedrock	1.00	Droughty	1.00
	Depth to hard bedrock	0.64	Depth to soft bedrock	1.00	Depth to bedrock	1.00
	Depth to soft bedrock	0.50	Large stones content	0.98	Large stones content	1.00

Table 13.—Building Site Development, Part I—Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SwE:						
Sylco	Very limited Slope Large stones content Depth to hard bedrock	 1.00 0.97 0.46	Very limited Slope Depth to hard bedrock Large stones content	 1.00 1.00 0.97	Very limited Slope Large stones content Depth to bedrock Droughty	 1.00 1.00 0.46 0.09
Cataska	Very limited Slope Large stones content Depth to hard bedrock Depth to soft bedrock	 1.00 0.98 0.64 0.50	Very limited Slope Depth to hard bedrock Depth to soft bedrock Large stones content	 1.00 1.00 1.00 0.98	Very limited Slope Droughty Depth to bedrock Large stones content	 1.00 1.00 1.00 1.00
SyD:						
Sylco	Very limited Slope Depth to hard bedrock	 1.00 0.46	Very limited Slope Depth to hard bedrock	 1.00 1.00	Very limited Slope Depth to bedrock Droughty Large stones content	 1.00 0.46 0.41 0.20
Soco	Very limited Slope	 1.00	Very limited Slope Depth to soft bedrock	 1.00 0.10	Very limited Slope Large stones content Depth to bedrock	 1.00 0.92 0.10
SyE:						
Sylco	Very limited Slope Depth to hard bedrock	 1.00 0.46	Very limited Slope Depth to hard bedrock	 1.00 1.00	Very limited Slope Depth to bedrock Droughty Large stones content	 1.00 0.46 0.41 0.20
Soco	Very limited Slope	 1.00	Very limited Slope Depth to soft bedrock	 1.00 0.10	Very limited Slope Large stones content Depth to bedrock	 1.00 0.92 0.10
SzF:						
Sylco	Very limited Slope Depth to hard bedrock	 1.00 0.46	Very limited Slope Depth to hard bedrock	 1.00 1.00	Very limited Slope Depth to bedrock Droughty Large stones content	 1.00 0.46 0.41 0.20
Soco	Very limited Slope	 1.00	Very limited Slope Depth to soft bedrock	 1.00 0.10	Very limited Slope Large stones content Depth to bedrock	 1.00 0.92 0.10

Table 13.—Building Site Development, Part I—Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
TaB:						
Tate	Not limited		Not limited		Not limited	
TaC:						
Tate	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63	Slope	0.63
TaD:						
Tate	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
TkC:						
Tate	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63	Slope	0.63
TkD:						
Tate	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
TmC:						
Tate	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	0.04	Slope	0.04	Slope	0.04
Urban land	Not rated		Not rated		Not rated	
ToD:						
Toecane	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00	Large stones content	1.00
					Droughty	0.07
ToE:						
Toecane	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00	Large stones content	1.00
					Droughty	0.07
TrC:						
Toecane	Very limited		Very limited		Very limited	
	Large stones content	1.00	Large stones content	1.00	Large stones content	1.00
	Slope	0.63	Slope	0.63	Slope	0.63
					Droughty	0.07
Tusquitee	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63	Slope	0.63
					Large stones content	0.20
					Gravel content	0.07
TsD:						
Toecane	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00	Large stones content	1.00
					Droughty	0.07

Table 13.—Building Site Development, Part I—Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
TsD:						
Tusquitee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.20
					Gravel content	0.07
TsE:						
Toecane	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00	Large stones content	1.00
					Droughty	0.07
Tusquitee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.20
					Gravel content	0.07
TuD:						
Tusquitee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.20
					Gravel content	0.07
Toecane	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00	Large stones content	1.00
					Droughty	0.07
TwB:						
Tusquitee	Not limited		Not limited		Not limited	
Whiteside	Not limited		Very limited		Not limited	
			Depth to saturated zone	0.99		
TwC:						
Tusquitee	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63	Slope	0.63
Whiteside	Somewhat limited		Very limited		Somewhat limited	
	Slope	0.63	Depth to saturated zone	0.99	Slope	0.63
			Slope	0.63		
UcB:						
Udifluvents	Very limited		Very limited		Very limited	
	Flooding	1.00	Flooding	1.00	Flooding	1.00
			Depth to saturated zone	0.47	Too sandy	0.50
					Droughty	0.34
Ud:						
Udorthents	Not limited		Not limited		Not limited	

Table 13.—Building Site Development, Part I—Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
UfB:						
Udorthents	Very limited Flooding	 1.00	Very limited Flooding	 1.00	Somewhat limited Flooding	 0.60
Urban land	Not rated		Not rated		Not rated	
UhE:						
Udorthents	Very limited Slope	 1.00	Very limited Slope	 1.00	Very limited Slope	 1.00
Urban land	Not rated		Not rated		Not rated	
UkE:						
Unaka	Very limited Slope Depth to hard bedrock	 1.00 0.35	Very limited Slope Depth to hard bedrock Depth to soft bedrock	 1.00 1.00 0.71	Very limited Slope Depth to bedrock	 1.00 0.71
Rock outcrop	Not rated		Not rated		Not rated	
UkF:						
Unaka	Very limited Slope Depth to hard bedrock	 1.00 0.35	Very limited Slope Depth to hard bedrock Depth to soft bedrock	 1.00 1.00 0.71	Very limited Slope Depth to bedrock	 1.00 0.71
Rock outcrop	Not rated		Not rated		Not rated	
UrD:						
Unicoi	Very limited Depth to hard bedrock Slope Large stones content	 1.00 1.00 0.01	Very limited Depth to hard bedrock Slope Large stones content	 1.00 1.00 0.01	Very limited Droughty Depth to bedrock Slope Large stones content	 1.00 1.00 1.00 0.61
Rock outcrop	Not rated		Not rated		Not rated	
UsB:						
Unison	Somewhat limited Shrink-swell	 0.50	Somewhat limited Shrink-swell	 0.50	Somewhat limited Large stones content	 0.01
UsC:						
Unison	Somewhat limited Slope Shrink-swell	 0.63 0.50	Somewhat limited Slope Shrink-swell	 0.63 0.50	Somewhat limited Slope Large stones content	 0.63 0.01
UsD:						
Unison	Very limited Slope Shrink-swell	 1.00 0.50	Very limited Slope Shrink-swell	 1.00 0.50	Very limited Slope Large stones content	 1.00 0.01

Table 13.—Building Site Development, Part I—Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
W:						
Water	Not rated		Not rated		Not rated	
WaC2:						
Walnut	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	0.63	Depth to soft bedrock	0.74	Depth to bedrock	0.74
			Slope	0.63	Slope	0.63
					Droughty	0.21
Oteen	Somewhat limited		Very limited		Very limited	
	Slope	0.63	Depth to soft bedrock	1.00	Depth to bedrock	1.00
	Depth to soft bedrock	0.50	Slope	0.63	Droughty	1.00
					Slope	0.63
Mars Hill	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63	Slope	0.63
WaD2:						
Walnut	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.74	Depth to bedrock	0.74
					Droughty	0.21
Oteen	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to soft bedrock	0.50	Depth to soft bedrock	1.00	Depth to bedrock	1.00
					Droughty	1.00
Mars Hill	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
WaE2:						
Walnut	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.74	Depth to bedrock	0.74
					Droughty	0.21
Oteen	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to soft bedrock	0.50	Depth to soft bedrock	1.00	Depth to bedrock	1.00
					Droughty	1.00
Mars Hill	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
WoF:						
Walnut	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
			Depth to soft bedrock	0.74	Depth to bedrock	0.74
					Droughty	0.08
Oteen	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to soft bedrock	0.50	Depth to soft bedrock	1.00	Depth to bedrock	1.00
					Droughty	1.00
Rock outcrop	Not rated		Not rated		Not rated	

Table 13.—Building Site Development, Part I—Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
WrC:						
Wayah	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63	Slope	0.63
					Large stones content	0.01
Burton	Somewhat limited		Very limited		Somewhat limited	
	Depth to hard bedrock	0.84	Depth to hard bedrock	1.00	Depth to bedrock	0.84
	Slope	0.63	Slope	0.63	Slope	0.63
					Large stones content	0.16
WrD:						
Wayah	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.01
Burton	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	0.84	Depth to hard bedrock	1.00	Depth to bedrock	0.84
					Large stones content	0.16
WrE:						
Wayah	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.01
Burton	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	0.84	Depth to hard bedrock	1.00	Depth to bedrock	0.84
					Large stones content	0.16
WsF:						
Wayah	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.01
Burton	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to hard bedrock	0.84	Depth to hard bedrock	1.00	Depth to bedrock	0.84
					Large stones content	0.16
WtB:						
Whiteside	Not limited		Very limited		Not limited	
			Depth to saturated zone	0.99		

Table 13.—Building Site Development, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Local roads and streets		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value
AcD:				
Ashe	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Frost action	0.50	Slope	1.00
	Depth to hard bedrock	0.46	Cutbanks cave	1.00
Cleveland	Very limited		Very limited	
	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Rock outcrop	Not rated		Not rated	
ArE:				
Ashe	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Frost action	0.50	Slope	1.00
	Depth to hard bedrock	0.46	Cutbanks cave	1.00
Cleveland	Very limited		Very limited	
	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Rock outcrop	Not rated		Not rated	
ArF:				
Ashe	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Frost action	0.50	Slope	1.00
	Depth to hard bedrock	0.46	Cutbanks cave	1.00
Cleveland	Very limited		Very limited	
	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Rock outcrop	Not rated		Not rated	
BaA:				
Biltmore	Very limited		Very limited	
	Flooding	1.00	Cutbanks cave	1.00
			Flooding	0.60
			Depth to saturated zone	0.24

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Local roads and streets		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value
BkB2:				
Braddock	Very limited		Somewhat limited	
	Low strength	1.00	Too clayey	0.12
	Shrink-swell	0.50	Cutbanks cave	0.10
	Frost action	0.50		
BkC2:				
Braddock	Very limited		Somewhat limited	
	Low strength	1.00	Slope	0.63
	Slope	0.63	Too clayey	0.12
	Shrink-swell	0.50	Cutbanks cave	0.10
	Frost action	0.50		
BkD2:				
Braddock	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Low strength	1.00	Too clayey	0.12
	Shrink-swell	0.50	Cutbanks cave	0.10
	Frost action	0.50		
BnD:				
Buladean	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Chestnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Depth to soft bedrock	0.74
			Cutbanks cave	0.10
BnE:				
Buladean	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Chestnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Depth to soft bedrock	0.74
			Cutbanks cave	0.10
BnF:				
Buladean	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Chestnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Depth to soft bedrock	0.74
			Cutbanks cave	0.10
CaD:				
Calvin	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.71	Large stones content	0.71
	Frost action	0.50	Cutbanks cave	0.10
			Depth to soft bedrock	0.10

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Local roads and streets		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value
CaE:				
Calvin	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.71	Large stones content	0.71
	Frost action	0.50	Cutbanks cave	0.10
			Depth to soft bedrock	0.10
CaF:				
Calvin	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.71	Large stones content	0.71
	Frost action	0.50	Cutbanks cave	0.10
			Depth to soft bedrock	0.10
CfF:				
Cataska	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
	Depth to hard bedrock	0.64	Slope	1.00
	Frost action	0.50		
Sylco	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Low strength	1.00	Slope	1.00
	Frost action	0.50		
	Depth to hard bedrock	0.46		
Rock outcrop	Not rated		Not rated	
ChD:				
Cheoah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Jeffrey	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Frost action	0.50	Slope	1.00
	Depth to hard bedrock	0.35	Cutbanks cave	0.10
ChE:				
Cheoah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Jeffrey	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Frost action	0.50	Slope	1.00
	Depth to hard bedrock	0.35	Cutbanks cave	0.10

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Local roads and streets		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value
ChF:				
Cheoah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Jeffrey	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Frost action	0.50	Slope	1.00
	Depth to hard bedrock	0.35	Cutbanks cave	0.10
CsD:				
Chestoa	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to hard bedrock	0.79	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
CsE:				
Chestoa	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to hard bedrock	0.79	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
CsF:				
Chestoa	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to hard bedrock	0.79	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
CtB2:				
Clifton	Very limited		Somewhat limited	
	Low strength	1.00	Too clayey	0.12
	Shrink-swell	0.50	Cutbanks cave	0.10
	Frost action	0.50		
CtC2:				
Clifton	Very limited		Somewhat limited	
	Low strength	1.00	Slope	0.63
	Slope	0.63	Too clayey	0.12
	Shrink-swell	0.50	Cutbanks cave	0.10
	Frost action	0.50		
CtD2:				
Clifton	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Low strength	1.00	Too clayey	0.12
	Shrink-swell	0.50	Cutbanks cave	0.10
	Frost action	0.50		
CtE2:				
Clifton	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Low strength	1.00	Too clayey	0.12
	Shrink-swell	0.50	Cutbanks cave	0.10
	Frost action	0.50		

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Local roads and streets		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value
CxC:				
Clifton	Very limited		Somewhat limited	
	Low strength	1.00	Slope	0.63
	Slope	0.63	Too clayey	0.12
	Shrink-swell	0.50	Cutbanks cave	0.10
	Frost action	0.50		
Urban land	Not rated		Not rated	
DeA:				
Dellwood	Very limited		Very limited	
	Flooding	1.00	Cutbanks cave	1.00
	Large stones content	0.02	Depth to saturated zone	0.95
			Flooding	0.60
			Large stones content	0.02
Reddies	Very limited		Very limited	
	Flooding	1.00	Cutbanks cave	1.00
	Frost action	0.50	Depth to saturated zone	0.99
			Flooding	0.60
DrB:				
Dillard	Very limited		Very limited	
	Low strength	1.00	Depth to saturated zone	0.99
	Frost action	0.50	Cutbanks cave	0.10
	Flooding	0.40		
DtD:				
Ditney	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Frost action	0.50	Slope	1.00
	Depth to hard bedrock	0.46	Cutbanks cave	0.10
Unicoi	Very limited		Very limited	
	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Slope	1.00
	Frost action	0.50	Large stones content	0.10
	Large stones content	0.10	Cutbanks cave	0.10
DuE:				
Ditney	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Frost action	0.50	Slope	1.00
	Depth to hard bedrock	0.46	Cutbanks cave	0.10
Unicoi	Very limited		Very limited	
	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Slope	1.00
	Frost action	0.50	Large stones content	0.10
	Large stones content	0.10	Cutbanks cave	0.10

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Local roads and streets		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value
DuF:				
Ditney	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Frost action	0.50	Slope	1.00
	Depth to hard bedrock	0.46	Cutbanks cave	0.10
Unicoi	Very limited		Very limited	
	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
	Large stones content	0.01	Large stones content	0.01
EdD:				
Edneyville	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Chestnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	1.00
			Depth to soft bedrock	0.06
EdE:				
Edneyville	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Chestnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	1.00
			Depth to soft bedrock	0.06
EdF:				
Edneyville	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Chestnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	1.00
			Depth to soft bedrock	0.06
EfA:				
Ela	Very limited		Very limited	
	Ponding	1.00	Ponding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Flooding	1.00	Cutbanks cave	1.00
	Frost action	0.50	Flooding	0.80
EvD2:				
Evard	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Local roads and streets		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value
EvD2:				
Cowee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	1.00
			Depth to soft bedrock	0.74
EvE2:				
Evard	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Cowee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	1.00
			Depth to soft bedrock	0.74
EvF2:				
Evard	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Cowee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	1.00
			Depth to soft bedrock	0.74
EwD:				
Evard	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Cowee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
			Depth to soft bedrock	0.01
EwE:				
Evard	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Cowee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
			Depth to soft bedrock	0.01
EwF:				
Evard	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Cowee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
			Depth to soft bedrock	0.01

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Local roads and streets		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value
FnD2:				
Fannin	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
FrA:				
French	Very limited		Very limited	
	Flooding	1.00	Depth to saturated zone	1.00
	Frost action	0.50	Cutbanks cave	1.00
	Depth to saturated zone	0.48	Flooding	0.60
HcE:				
Heintooga	Very limited		Very limited	
	Large stones content	1.00	Large stones content	1.00
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Chiltoskie	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
HpA:				
Hemphill, drained	Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Low strength	1.00	Too clayey	0.28
	Frost action	0.50	Cutbanks cave	0.10
	Flooding	0.40		
Hemphill, undrained	Very limited		Very limited	
	Ponding	1.00	Ponding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Low strength	1.00	Too clayey	0.28
	Frost action	0.50	Cutbanks cave	0.10
	Flooding	0.40		
JbD:				
Junaluska	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Depth to soft bedrock	0.06
Brasstown	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Low strength	1.00	Cutbanks cave	0.10
	Frost action	0.50		
JbE:				
Junaluska	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Depth to soft bedrock	0.06
Brasstown	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Low strength	1.00	Cutbanks cave	0.10
	Frost action	0.50		

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Local roads and streets		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value
JbF:				
Junaluska	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Depth to soft bedrock	0.06
Brasstown	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Low strength	1.00	Cutbanks cave	0.10
	Frost action	0.50		
KnC:				
Keener	Somewhat limited		Very limited	
	Low strength	0.76	Cutbanks cave	1.00
	Slope	0.63	Slope	0.63
	Frost action	0.50		
MwC:				
Mars Hill	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
	Frost action	0.50	Cutbanks cave	0.10
Walnut	Somewhat limited		Very limited	
	Slope	0.63	Cutbanks cave	1.00
	Frost action	0.50	Depth to soft bedrock	0.74
			Slope	0.63
MwD:				
Mars Hill	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Walnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	1.00
			Depth to soft bedrock	0.74
MwE:				
Mars Hill	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Walnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	1.00
			Depth to soft bedrock	0.74
MwF:				
Mars Hill	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Walnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	1.00
			Depth to soft bedrock	0.74

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Local roads and streets		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value
MyB:				
Maymead	Somewhat limited		Somewhat limited	
	Frost action	0.50	Cutbanks cave	0.10
Northcove	Very limited		Very limited	
	Large stones content	1.00	Large stones content	1.00
	Frost action	0.50	Cutbanks cave	0.10
NhC:				
Northcove	Very limited		Very limited	
	Large stones content	1.00	Large stones content	1.00
	Slope	0.63	Slope	0.63
	Frost action	0.50	Cutbanks cave	0.10
Maymead	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
	Frost action	0.50	Cutbanks cave	0.10
NtD:				
Northcove	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00
	Frost action	0.50	Cutbanks cave	0.10
Maymead	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
NtE:				
Northcove	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00
	Frost action	0.50	Cutbanks cave	0.10
Maymead	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
OwC:				
Oconaluftee	Somewhat limited		Somewhat limited	
	Frost action	0.50	Slope	0.37
	Slope	0.37	Cutbanks cave	0.10
Guyot	Somewhat limited		Somewhat limited	
	Frost action	0.50	Slope	0.37
	Slope	0.37	Cutbanks cave	0.10
Cataloochee	Somewhat limited		Somewhat limited	
	Frost action	0.50	Dense layer	0.50
	Slope	0.37	Slope	0.37
			Depth to soft bedrock	0.35
			Cutbanks cave	0.10

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Local roads and streets		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value
OwD:				
Oconaluftee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Guyot	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Cataloochee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Dense layer	0.50
			Depth to soft bedrock	0.35
			Cutbanks cave	0.10
OwE:				
Oconaluftee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Guyot	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Cataloochee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Dense layer	0.50
			Depth to soft bedrock	0.35
			Cutbanks cave	0.10
OwF:				
Oconaluftee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Guyot	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Cataloochee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Dense layer	0.50
			Depth to soft bedrock	0.35
			Cutbanks cave	0.10
PwC:				
Porters	Somewhat limited		Very limited	
	Slope	0.63	Cutbanks cave	1.00
	Frost action	0.50	Slope	0.63
			Depth to hard bedrock	0.13

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Local roads and streets		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value
PwC:				
Unaka	Somewhat limited		Very limited	
	Slope	0.63	Depth to hard bedrock	1.00
	Frost action	0.50	Cutbanks cave	1.00
	Depth to hard bedrock	0.35	Depth to soft bedrock	0.71
			Slope	0.63
PwD:				
Porters	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	1.00
			Depth to hard bedrock	0.13
Unaka	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Frost action	0.50	Slope	1.00
	Depth to hard bedrock	0.35	Cutbanks cave	1.00
			Depth to soft bedrock	0.71
PwE:				
Porters	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	1.00
			Depth to hard bedrock	0.13
Unaka	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Frost action	0.50	Slope	1.00
	Depth to hard bedrock	0.35	Cutbanks cave	1.00
			Depth to soft bedrock	0.71
PxF:				
Porters	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	1.00
			Depth to hard bedrock	0.13
Unaka	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Frost action	0.50	Slope	1.00
	Depth to hard bedrock	0.35	Cutbanks cave	1.00
			Depth to soft bedrock	0.71
RbA:				
Reddies	Very limited		Very limited	
	Flooding	1.00	Cutbanks cave	1.00
	Frost action	0.50	Depth to saturated zone	0.99
			Flooding	0.60

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Local roads and streets		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value
RcF:				
Rock outcrop	Not rated		Not rated	
Cataska	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
	Depth to hard bedrock	0.64	Slope	1.00
	Frost action	0.50		
RhD:				
Rock outcrop	Not rated		Not rated	
Chestoa	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to hard bedrock	0.79	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
RhF:				
Rock outcrop	Not rated		Not rated	
Chestoa	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to hard bedrock	0.79	Slope	1.00
			Cutbanks cave	0.10
RkF:				
Rock outcrop	Not rated		Not rated	
Cleveland	Very limited		Very limited	
	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
RoF:				
Rock outcrop	Not rated		Not rated	
Oteen	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to soft bedrock	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
RpF:				
Rock outcrop	Not rated		Not rated	
Unicoi	Very limited		Very limited	
	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
	Large stones content	0.01	Large stones content	0.01

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Local roads and streets		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value
RsA:				
Rosman	Very limited		Somewhat limited	
	Flooding	1.00	Flooding	0.60
	Frost action	0.50	Depth to saturated zone	0.47
			Cutbanks cave	0.10
SoD:				
Soco	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
			Depth to soft bedrock	0.10
Stecoah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
SoE:				
Soco	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
			Depth to soft bedrock	0.10
Stecoah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
SoF:				
Soco	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
			Depth to soft bedrock	0.10
Stecoah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
StB:				
Statler	Very limited		Somewhat limited	
	Low strength	1.00	Depth to saturated zone	0.16
	Frost action	0.50		
	Flooding	0.40	Cutbanks cave	0.10
SwD:				
Sylco	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Large stones content	0.97	Slope	1.00
	Frost action	0.50	Large stones content	0.97
	Depth to hard bedrock	0.46	Cutbanks cave	0.10

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Local roads and streets		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value
SwD:				
Cataska	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
	Large stones content	0.98	Slope	1.00
	Depth to hard bedrock	0.64	Large stones content	0.98
	Frost action	0.50		
SwE:				
Sylco	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Large stones content	0.97	Slope	1.00
	Frost action	0.50	Large stones content	0.97
	Depth to hard bedrock	0.46	Cutbanks cave	0.10
Cataska	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
	Large stones content	0.98	Slope	1.00
	Depth to hard bedrock	0.64	Large stones content	0.98
	Frost action	0.50		
SyD:				
Sylco	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Frost action	0.50	Slope	1.00
	Depth to hard bedrock	0.46		
Soco	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
			Depth to soft bedrock	0.10
SyE:				
Sylco	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Frost action	0.50	Slope	1.00
	Depth to hard bedrock	0.46		
Soco	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
			Depth to soft bedrock	0.10

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Local roads and streets		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value
SzF:				
Sylco	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Frost action	0.50	Slope	1.00
	Depth to hard bedrock	0.46		
Soco	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
			Depth to soft bedrock	0.10
TaB:				
Tate	Very limited		Somewhat limited	
	Low strength	1.00	Cutbanks cave	0.10
	Frost action	0.50		
TaC:				
Tate	Very limited		Somewhat limited	
	Low strength	1.00	Slope	0.63
	Slope	0.63	Cutbanks cave	0.10
	Frost action	0.50		
TaD:				
Tate	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Low strength	1.00	Cutbanks cave	0.10
	Frost action	0.50		
TkC:				
Tate	Somewhat limited		Very limited	
	Slope	0.63	Cutbanks cave	1.00
	Frost action	0.50	Slope	0.63
TkD:				
Tate	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	1.00
TmC:				
Tate	Very limited		Somewhat limited	
	Low strength	1.00	Cutbanks cave	0.10
	Frost action	0.50	Slope	0.04
	Slope	0.04		
Urban land	Not rated		Not rated	
ToD:				
Toecane	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Cutbanks cave	1.00
	Frost action	0.50	Large stones content	1.00
ToE:				
Toecane	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Cutbanks cave	1.00
	Frost action	0.50	Large stones content	1.00

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Local roads and streets		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value
TrC:				
Toecane	Very limited		Very limited	
	Large stones content	1.00	Cutbanks cave	1.00
	Slope	0.63	Large stones content	1.00
	Frost action	0.50	Slope	0.63
Tusquitee	Somewhat limited		Very limited	
	Slope	0.63	Cutbanks cave	1.00
	Frost action	0.50	Slope	0.63
TsD:				
Toecane	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Cutbanks cave	1.00
	Frost action	0.50	Large stones content	1.00
Tusquitee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	1.00
TsE:				
Toecane	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Cutbanks cave	1.00
	Frost action	0.50	Large stones content	1.00
Tusquitee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	1.00
TuD:				
Tusquitee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	1.00
Toecane	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Cutbanks cave	1.00
	Frost action	0.50	Large stones content	1.00
TwB:				
Tusquitee	Somewhat limited		Very limited	
	Frost action	0.50	Cutbanks cave	1.00
Whiteside	Somewhat limited		Very limited	
	Frost action	0.50	Depth to saturated zone	0.99
			Cutbanks cave	0.10
TwC:				
Tusquitee	Somewhat limited		Very limited	
	Slope	0.63	Cutbanks cave	1.00
	Frost action	0.50	Slope	0.63

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Local roads and streets		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value
TwC:				
Whiteside	Somewhat limited		Very limited	
	Slope	0.63	Depth to saturated zone	0.99
	Frost action	0.50	Slope	0.63
			Cutbanks cave	0.10
UcB:				
Udifluvents	Very limited		Very limited	
	Flooding	1.00	Cutbanks cave	1.00
			Flooding	0.80
			Depth to saturated zone	0.47
Ud:				
Udorthents	Somewhat limited		Somewhat limited	
	Frost action	0.50	Cutbanks cave	0.10
UfB:				
Udorthents	Very limited		Somewhat limited	
	Flooding	1.00	Flooding	0.60
	Frost action	0.50	Cutbanks cave	0.10
Urban land	Not rated		Not rated	
UhE:				
Udorthents	Not rated		Very limited	
			Slope	1.00
			Cutbanks cave	0.10
Urban land	Not rated		Not rated	
UkE:				
Unaka	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Frost action	0.50	Slope	1.00
	Depth to hard bedrock	0.35	Cutbanks cave	1.00
			Depth to soft bedrock	0.71
Rock outcrop	Not rated		Not rated	
UkF:				
Unaka	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Frost action	0.50	Slope	1.00
	Depth to hard bedrock	0.35	Cutbanks cave	1.00
			Depth to soft bedrock	0.71
Rock outcrop	Not rated		Not rated	

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value
UrD:				
Unicoi	Very limited		Very limited	
	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
	Large stones content	0.01	Large stones content	0.01
Rock outcrop	Not rated		Not rated	
UsB:				
Unison	Very limited		Very limited	
	Low strength	1.00	Cutbanks cave	1.00
	Shrink-swell	0.50	Too clayey	0.50
	Frost action	0.50		
UsC:				
Unison	Very limited		Very limited	
	Low strength	1.00	Cutbanks cave	1.00
	Slope	0.63	Slope	0.63
	Shrink-swell	0.50	Too clayey	0.50
	Frost action	0.50		
UsD:				
Unison	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Low strength	1.00	Cutbanks cave	1.00
	Shrink-swell	0.50	Too clayey	0.50
	Frost action	0.50		
W:				
Water	Not rated		Not rated	
WaC2:				
Walnut	Somewhat limited		Very limited	
	Slope	0.63	Cutbanks cave	1.00
	Frost action	0.50	Depth to soft bedrock	0.74
			Slope	0.63
Oteen	Somewhat limited		Very limited	
	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
	Slope	0.63	Slope	0.63
	Frost action	0.50	Cutbanks cave	0.10
Mars Hill	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
	Frost action	0.50	Cutbanks cave	0.10
WaD2:				
Walnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	1.00
			Depth to soft bedrock	0.74

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Local roads and streets		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value
WaD2:				
Oteen	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to soft bedrock	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Mars Hill	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
WaE2:				
Walnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	1.00
			Depth to soft bedrock	0.74
Oteen	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to soft bedrock	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Mars Hill	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
WoF:				
Walnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	1.00
			Depth to soft bedrock	0.74
Oteen	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to soft bedrock	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
Rock outcrop	Not rated		Not rated	
WrC:				
Wayah	Somewhat limited		Very limited	
	Slope	0.63	Cutbanks cave	1.00
	Frost action	0.50	Slope	0.63
Burton	Somewhat limited		Very limited	
	Depth to hard bedrock	0.84	Depth to hard bedrock	1.00
	Slope	0.63	Slope	0.63
	Frost action	0.50	Cutbanks cave	0.10
WrD:				
Wayah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	1.00

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Local roads and streets		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value
WrD:				
Burton	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to hard bedrock	0.84	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
WrE:				
Wayah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	1.00
Burton	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to hard bedrock	0.84	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
WsF:				
Wayah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Frost action	0.50	Cutbanks cave	1.00
Burton	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to hard bedrock	0.84	Slope	1.00
	Frost action	0.50	Cutbanks cave	0.10
WtB:				
Whiteside	Somewhat limited		Very limited	
	Frost action	0.50	Depth to saturated zone	0.99
			Cutbanks cave	0.10

Table 14.—Sanitary Facilities, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
AcD:				
Ashe	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Cleveland	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Rock outcrop	Not rated		Not rated	
ArE:				
Ashe	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Cleveland	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Rock outcrop	Not rated		Not rated	
ArF:				
Ashe	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Cleveland	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Rock outcrop	Not rated		Not rated	
BaA:				
Biltmore	Very limited		Very limited	
	Flooding	1.00	Flooding	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Filtering capacity	1.00	Depth to saturated zone	0.02
	Depth to saturated zone	0.65		

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
BkB2:				
Braddock------------	Very limited		Very limited	
	Seepage, bottom layer	1.00	Seepage	1.00
			Slope	0.68
	Slow water movement	0.50		
BkC2:				
Braddock------------	Very limited		Very limited	
	Seepage, bottom layer	1.00	Slope	1.00
			Seepage	1.00
	Slope	0.63		
	Slow water movement	0.50		
BkD2:				
Braddock------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Slow water movement	0.50		
BnD:				
Buladean------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
			Depth to soft bedrock	0.42
	Depth to bedrock	0.78		
Chestnut------------	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00		
	Seepage, bottom layer	1.00	Slope	1.00
			Seepage	1.00
BnE:				
Buladean------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
			Depth to soft bedrock	0.42
	Depth to bedrock	0.78		
Chestnut------------	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00		
	Seepage, bottom layer	1.00	Slope	1.00
			Seepage	1.00
BnF:				
Buladean------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
			Depth to soft bedrock	0.42
	Depth to bedrock	0.78		
Chestnut------------	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00		
	Seepage, bottom layer	1.00	Slope	1.00
			Seepage	1.00

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
CaD:				
Calvin	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Large stones content	0.71	Large stones content	0.98
CaE:				
Calvin	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Large stones content	0.71	Large stones content	0.98
CaF:				
Calvin	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Large stones content	0.71	Large stones content	0.98
CfF:				
Cataska	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Depth to soft bedrock	1.00
	Seepage, bottom layer	1.00	Slope	1.00
			Seepage	0.18
Sylco	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Rock outcrop	Not rated		Not rated	
ChD:				
Cheoah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Depth to bedrock	0.73	Depth to soft bedrock	0.32
Jeffrey	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
ChE:				
Cheoah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Depth to bedrock	0.73	Depth to soft bedrock	0.32
Jeffrey	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
ChF:				
Cheoah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Depth to bedrock	0.73	Depth to soft bedrock	0.32
Jeffrey	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
CsD:				
Chestoa	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
CsE:				
Chestoa	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
CsF:				
Chestoa	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
CtB2:				
Clifton	Very limited		Very limited	
	Seepage, bottom layer	1.00	Seepage	1.00
	Slow water movement	0.50	Slope	0.68
CtC2:				
Clifton	Very limited		Very limited	
	Seepage, bottom layer	1.00	Slope	1.00
	Slope	0.63	Seepage	1.00
	Slow water movement	0.50		

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
CtD2:				
Clifton	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Slow water movement	0.50		
CtE2:				
Clifton	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Slow water movement	0.50		
CxC:				
Clifton	Very limited		Very limited	
	Seepage, bottom layer	1.00	Slope	1.00
			Seepage	1.00
	Slope	0.63		
	Slow water movement	0.50		
Urban land	Not rated		Not rated	
DeA:				
Dellwood	Very limited		Very limited	
	Flooding	1.00	Flooding	1.00
	Depth to saturated zone	1.00	Seepage	1.00
			Depth to saturated zone	1.00
	Seepage, bottom layer	1.00		
	Filtering capacity	1.00		
	Large stones content	0.02		
Reddies	Very limited		Very limited	
	Flooding	1.00	Flooding	1.00
	Depth to saturated zone	1.00	Seepage	1.00
			Depth to saturated zone	1.00
	Seepage, bottom layer	1.00		
DrB:				
Dillard	Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
			Flooding	0.40
	Slow water movement	0.50	Slope	0.08
	Flooding	0.40		
DtD:				
Ditney	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to bedrock	1.00		
	Seepage, bottom layer	1.00	Slope	1.00
			Seepage	1.00

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
DtD:				
Unicoi	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Large stones content	0.10	Large stones content	0.23
DuE:				
Ditney	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Unicoi	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Large stones content	0.10	Large stones content	0.23
DuF:				
Ditney	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Unicoi	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Large stones content	0.01	Large stones content	0.01
EdD:				
Edneyville	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Chestnut	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
EdE:				
Edneyville	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
EdE:				
Chestnut	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
EdF:				
Edneyville	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Chestnut	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
EfA:				
Ela, drained	Very limited		Very limited	
	Flooding	1.00	Ponding	1.00
	Ponding	1.00	Flooding	1.00
	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Ela, undrained	Very limited		Very limited	
	Flooding	1.00	Ponding	1.00
	Ponding	1.00	Flooding	1.00
	Depth to saturated zone	1.00	Seepage	1.00
	Seepage, bottom layer	1.00	Depth to saturated zone	1.00
EvD2:				
Evard	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Slow water movement	0.50	Seepage	0.50
Cowee	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Slow water movement	0.50	Seepage	0.50
EvE2:				
Evard	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Slow water movement	0.50	Seepage	0.50
Cowee	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Slow water movement	0.50	Seepage	0.50

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
EvF2:				
Evard	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Slow water movement	0.50	Seepage	0.50
Cowee	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Slow water movement	0.50	Seepage	0.50
EwD:				
Evard	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Slow water movement	0.50	Seepage	0.50
Cowee	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Slow water movement	0.50	Seepage	0.50
EwE:				
Evard	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Slow water movement	0.50	Seepage	0.50
Cowee	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Slow water movement	0.50	Seepage	0.50
EwF:				
Evard	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Slow water movement	0.50	Seepage	0.50
Cowee	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Slow water movement	0.50	Seepage	0.50
FnD2:				
Fannin	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Slow water movement	0.50	Seepage	0.50
FrA:				
French	Very limited		Very limited	
	Flooding	1.00	Flooding	1.00
	Depth to saturated zone	1.00	Seepage	1.00
	Seepage, bottom layer	1.00	Depth to saturated zone	1.00
	Slow water movement	0.50		

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
HcE:				
Heintooga-----------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Chiltoskie----------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
HpA:				
Hemphill, drained---	Very limited		Very limited	
	Slow water movement	1.00	Depth to saturated zone	1.00
	Depth to saturated zone	1.00	Seepage	0.50
	Flooding	0.40	Flooding	0.40
Hemphill, undrained-	Very limited		Very limited	
	Slow water movement	1.00	Ponding	1.00
	Ponding	1.00	Depth to saturated zone	1.00
	Depth to saturated zone	1.00	Seepage	0.50
	Flooding	0.40	Flooding	0.40
JbD:				
Junaluska-----------	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Brasstown-----------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	0.94	Depth to soft bedrock	0.84
	Slow water movement	0.50	Seepage	0.50
JbE:				
Junaluska-----------	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Brasstown-----------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	0.94	Depth to soft bedrock	0.84
	Slow water movement	0.50	Seepage	0.50
JbF:				
Junaluska-----------	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
JbF:				
Brasstown-----------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	0.94	Depth to soft bedrock	0.84
	Slow water movement	0.50	Seepage	0.50
KnC:				
Keener--------------	Very limited		Very limited	
	Seepage, bottom layer	1.00	Slope	1.00
	Slope	0.63	Seepage	1.00
	Slow water movement	0.50		
MwC:				
Mars Hill-----------	Very limited		Very limited	
	Seepage, bottom layer	1.00	Slope	1.00
	Depth to bedrock	0.91	Seepage	1.00
	Slope	0.63	Depth to soft bedrock	0.77
Walnut--------------	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to soft bedrock	1.00
	Seepage, bottom layer	1.00	Slope	1.00
	Slope	0.63	Seepage	1.00
MwD:				
Mars Hill-----------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Depth to bedrock	0.91	Depth to soft bedrock	0.77
Walnut--------------	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
MwE:				
Mars Hill-----------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Depth to bedrock	0.91	Depth to soft bedrock	0.77
Walnut--------------	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
MwF:				
Mars Hill-----------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Depth to bedrock	0.91	Depth to soft bedrock	0.77

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
MwF:				
Walnut-------------	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
MyB:				
Maymead------------	Very limited		Very limited	
	Seepage, bottom layer	1.00	Seepage	1.00
			Slope	0.68
Northcove----------	Very limited		Very limited	
	Large stones content	1.00	Seepage	1.00
	Seepage, bottom layer	1.00	Large stones cotnent	1.00
			Slope	0.68
NhC:				
Northcove----------	Very limited		Very limited	
	Large stones content	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Slope	0.63	Large stones content	1.00
Maymead------------	Very limited		Very limited	
	Seepage, bottom layer	1.00	Slope	1.00
	Slope	0.63	Seepage	1.00
NtD:				
Northcove----------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Seepage	1.00
	Seepage, bottom layer	1.00	Large stones content	1.00
Maymead------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
NtE:				
Northcove----------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Seepage	1.00
	Seepage, bottom layer	1.00	Large stones content	1.00
Maymead------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
OwC:				
Oconaluftee	Very limited		Very limited	
	Seepage, bottom layer	1.00	Slope	1.00
	Slope	0.37	Seepage	1.00
Guyot	Very limited		Very limited	
	Seepage, bottom layer	1.00	Slope	1.00
	Depth to bedrock	0.59	Seepage	1.00
	Slope	0.37	Depth to soft bedrock	0.13
Cataloochee	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to soft bedrock	1.00
	Seepage, bottom layer	1.00	Slope	1.00
	Slope	0.37	Seepage	1.00
OwD:				
Oconaluftee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Guyot	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Depth to bedrock	0.59	Depth to soft bedrock	0.13
Cataloochee	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
OwE:				
Oconaluftee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Guyot	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Depth to bedrock	0.59	Depth to soft bedrock	0.13
Cataloochee	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
OwF:				
Oconaluftee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
OwF:				
Guyot	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Depth to bedrock	0.59	Depth to soft bedrock	0.13
Cataloochee	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
PwC:				
Porters	Very limited		Very limited	
	Seepage, bottom layer	1.00	Slope	1.00
	Slope	0.63	Seepage	1.00
	Depth to bedrock	0.59	Depth to hard bedrock	0.13
Unaka	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to hard bedrock	1.00
	Seepage, bottom layer	1.00	Depth to soft bedrock	1.00
	Slope	0.63	Slope	1.00
			Seepage	1.00
PwD:				
Porters	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Depth to bedrock	0.59	Depth to hard bedrock	0.13
Unaka	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Depth to soft bedrock	1.00
	Seepage, bottom layer	1.00	Slope	1.00
			Seepage	1.00
PwE:				
Porters	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Depth to bedrock	0.59	Depth to hard bedrock	0.13
Unaka	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Depth to soft bedrock	1.00
	Seepage, bottom layer	1.00	Slope	1.00
			Seepage	1.00

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
PxF:				
Porters	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Depth to bedrock	0.59	Depth to hard bedrock	0.13
Unaka	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Depth to soft bedrock	1.00
	Seepage, bottom layer	1.00	Slope	1.00
			Seepage	1.00
RbA:				
Reddies	Very limited		Very limited	
	Flooding	1.00	Flooding	1.00
	Depth to saturated zone	1.00	Seepage	1.00
	Seepage, bottom layer	1.00	Depth to saturated zone	1.00
RcF:				
Rock outcrop	Not rated		Not rated	
Cataska	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Depth to soft bedrock	1.00
	Seepage, bottom layer	1.00	Slope	1.00
			Seepage	1.00
RhD:				
Rock outcrop	Not rated		Not rated	
Chestoa	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
RhF:				
Rock outcrop	Not rated		Not rated	
Chestoa	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
RkF:				
Rock outcrop	Not rated		Not rated	
Cleveland	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
RoF:				
Rock outcrop	Not rated		Not rated	
Oteen	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to soft bedrock	1.00
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
RpF:				
Rock outcrop	Not rated		Not rated	
Unicoi	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Large stones content	0.01	Large stones content	0.23
RsA:				
Rosman	Very limited		Very limited	
	Flooding	1.00	Flooding	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Depth to saturated zone	0.94	Depth to saturated zone	0.40
SoD:				
Soco	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Stecoah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Depth to bedrock	0.94	Depth to soft bedrock	0.84
SoE:				
Soco	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Stecoah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Depth to bedrock	0.78	Depth to soft bedrock	0.42
SoF:				
Soco	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
SoF:				
Stecoah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Depth to bedrock	0.94	Depth to soft bedrock	0.84
StB:				
Statler	Somewhat limited		Somewhat limited	
	Slow water movement	0.50	Seepage	0.50
	Depth to saturated zone	0.43	Flooding	0.40
	Flooding	0.40	Slope	0.08
SwD:				
Sylco	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Large stones content	0.97	Large stones content	1.00
Cataska	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Depth to soft bedrock	1.00
	Seepage, bottom layer	1.00	Slope	1.00
	Large stones content	0.98	Seepage	1.00
			Large stones content	1.00
SwE:				
Sylco	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Large stones content	0.97	Large stones content	1.00
Cataska	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to hard bedrock	1.00
	Slope	1.00	Depth to soft bedrock	1.00
	Seepage, bottom layer	1.00	Slope	1.00
	Large stones content	0.98	Seepage	1.00
			Large stones content	1.00
SyD:				
Sylco	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
SyD:				
Soco	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
SyE:				
Sylco	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Soco	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
SzF:				
Sylco	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Soco	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
TaB:				
Tate	Very limited		Very limited	
	Seepage, bottom layer	1.00	Seepage	1.00
	Slow water movement	0.50	Slope	0.68
TaC:				
Tate	Very limited		Very limited	
	Seepage, bottom layer	1.00	Slope	1.00
	Slope	0.63	Seepage	1.00
	Slow water movement	0.50		
TaD:				
Tate	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Slow water movement	0.50		
TkC:				
Tate	Very limited		Very limited	
	Seepage, bottom layer	1.00	Slope	1.00
	Slope	0.63	Seepage	1.00
	Slow water movement	0.50		

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
TkD:				
Tate----------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Slow water movement	0.50		
TmC:				
Tate----------------	Very limited		Very limited	
	Seepage, bottom layer	1.00	Seepage	1.00
	Slow water movement	0.50	Slope	1.00
	Slope	0.04		
Urban land----------	Not rated		Not rated	
ToD:				
Toecane-------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
ToE:				
Toecane-------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
TrC:				
Toecane-------------	Very limited		Very limited	
	Large stones content	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Slope	0.63	Large stones content	1.00
Tusquitee-----------	Very limited		Very limited	
	Seepage, bottom layer	1.00	Slope	1.00
	Slope	0.63	Seepage	1.00
TsD:				
Toecane-------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Seepage	1.00
	Seepage, bottom layer	1.00	Large stones content	1.00
Tusquitee-----------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
TsE:				
Toecane	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Seepage	1.00
	Seepage, bottom layer	1.00	Large stones content	1.00
Tusquitee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
TuD:				
Tusquitee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Toecane	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Seepage	1.00
	Seepage, bottom layer	1.00	Large stones content	1.00
TwB:				
Tusquitee	Very limited		Very limited	
	Seepage, bottom layer	1.00	Seepage	1.00
			Slope	0.68
Whiteside	Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Slow water movement	0.50	Slope	0.68
TwC:				
Tusquitee	Very limited		Very limited	
	Seepage, bottom layer	1.00	Slope	1.00
	Slope	0.63	Seepage	1.00
Whiteside	Very limited		Very limited	
	Depth to saturated zone	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Depth to saturated zone	1.00
	Slope	0.63	Seepage	1.00
	Slow water movement	0.50		
UcB:				
Udifluvents	Very limited		Very limited	
	Flooding	1.00	Flooding	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Filtering capacity	1.00	Depth to saturated zone	0.40
	Depth to saturated zone	0.94	Slope	0.08

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
Ud:				
Udorthents	Very limited Seepage, bottom layer	 1.00	Very limited Slope Seepage	 1.00 1.00
UfB:				
Udorthents	Very limited Flooding Seepage, bottom layer	 1.00 1.00	Very limited Flooding Seepage Slope	 1.00 1.00 0.08
Urban land	Not rated		Not rated	
UhE:				
Udorthents	Very limited Slope Seepage, bottom layer	 1.00 1.00	Very limited Slope Seepage	 1.00 1.00
Urban land	Not rated		Not rated	
UkE:				
Unaka	Very limited Depth to bedrock Slope Seepage, bottom layer	 1.00 1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope Seepage	 1.00 1.00 1.00 1.00
Rock outcrop	Not rated		Not rated	
UkF:				
Unaka	Very limited Depth to bedrock Slope Seepage, bottom layer	 1.00 1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope Seepage	 1.00 1.00 1.00 1.00
Rock outcrop	Not rated		Not rated	
UrD:				
Unicoi	Very limited Depth to bedrock Slope Seepage, bottom layer Large stones content	 1.00 1.00 1.00 0.01	Very limited Depth to hard bedrock Slope Seepage Large stones content	 1.00 1.00 1.00 0.23
Rock outcrop	Not rated		Not rated	
UsB:				
Unison	Very limited Seepage, bottom layer Slow water movement	 1.00 0.50	Very limited Seepage Slope	 1.00 0.68

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
UsC:				
Unison	Very limited		Very limited	
	Seepage, bottom layer	1.00	Slope	1.00
	Slope	0.63	Seepage	1.00
	Slow water movement	0.50		
UsD:				
Unison	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Slow water movement	0.50		
W:				
Water	Not rated		Not rated	
WaC2:				
Walnut	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to soft bedrock	1.00
	Seepage, bottom layer	1.00	Slope	1.00
	Slope	0.63	Seepage	1.00
Oteen	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to soft bedrock	1.00
	Seepage, bottom layer	1.00	Slope	1.00
	Slope	0.63	Seepage	1.00
Mars Hill	Very limited		Very limited	
	Seepage, bottom layer	1.00	Slope	1.00
	Depth to bedrock	0.91	Seepage	1.00
	Slope	0.63	Depth to soft bedrock	0.77
WaD2:				
Walnut	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Oteen	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to soft bedrock	1.00
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Mars Hill	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Depth to bedrock	0.91	Depth to soft bedrock	0.77

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
WaE2:				
Walnut	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Oteen	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to soft bedrock	1.00
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Mars Hill	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Depth to bedrock	0.91	Depth to soft bedrock	0.77
WoF:				
Walnut	Very limited		Very limited	
	Slope	1.00	Depth to soft bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Oteen	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to soft bedrock	1.00
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Rock outcrop	Not rated		Not rated	
WrC:				
Wayah	Very limited		Very limited	
	Seepage, bottom layer	1.00	Slope	1.00
	Slope	0.63	Seepage	1.00
Burton	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to hard bedrock	1.00
	Seepage, bottom layer	1.00	Slope	1.00
	Slope	0.63	Seepage	1.00
WrD:				
Wayah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Burton	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
WrE:				
Wayah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Burton	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
WsF:				
Wayah	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
Burton	Very limited		Very limited	
	Slope	1.00	Depth to hard bedrock	1.00
	Depth to bedrock	1.00	Slope	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
WtB:				
Whiteside	Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Seepage, bottom layer	1.00	Seepage	1.00
	Slow water movement	0.50	Slope	0.68

Table 14.—Sanitary Facilities, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AcD:							
Ashe	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Cleveland	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
Rock outcrop	20	Not rated		Not rated		Not rated	
ArE:							
Ashe	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Cleveland	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
Rock outcrop	20	Not rated		Not rated		Not rated	
ArF:							
Ashe	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Cleveland	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
Rock outcrop	20	Not rated		Not rated		Not rated	
BaA:							
Biltmore	90	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Too sandy	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Seepage	1.00		
		Too sandy	1.00				

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill Rating class and limiting features	Value	Area sanitary landfill Rating class and limiting features	Value	Daily cover for landfill Rating class and limiting features	Value
BkB2:							
Braddock	80	Very limited		Not limited		Very limited	
		Too clayey	1.00			Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00
BkC2:							
Braddock	80	Very limited		Somewhat limited		Very limited	
		Too clayey	1.00	Slope	0.63	Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00
		Slope	0.63			Slope	0.63
BkD2:							
Braddock	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Too clayey	1.00			Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00
BnD:							
Buladean	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.42	Depth to bedrock	0.42
Chestnut	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
BnE:							
Buladean	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.42	Depth to bedrock	0.42
Chestnut	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
BnF:							
Buladean	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.42	Depth to bedrock	0.42
Chestnut	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CaD:							
Calvin	75	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Large stones content	0.71
		Large stones content	0.71			Seepage	0.50
						Gravel content	0.02
CaE:							
Calvin	80	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Large stones content	0.71
		Large stones content	0.71			Seepage	0.50
						Gravel content	0.02
CaF:							
Calvin	80	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Large stones content	0.71
		Large stones content	0.71			Seepage	0.50
						Gravel content	0.02
CfF:							
Cataska	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Gravel content	0.36
Sylco	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.21
Rock outcrop	20	Not rated		Not rated		Not rated	
ChD:							
Cheoah	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.32	Depth to bedrock	0.32
Jeffrey	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
ChE:							
Cheoah	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.32	Depth to bedrock	0.32

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
ChE:							
Jeffrey	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
ChF:							
Cheoah	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.32	Depth to bedrock	0.32
Jeffrey	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
CsD:							
Chestoa	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
CsE:							
Chestoa	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
CsF:							
Chestoa	80	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
CtB2:							
Clifton	85	Very limited		Not limited		Very limited	
		Too clayey	1.00			Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00
CtC2:							
Clifton	85	Very limited		Somewhat limited		Very limited	
		Too clayey	1.00	Slope	0.63	Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00
		Slope	0.63			Slope	0.63
CtD2:							
Clifton	80	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Too clayey	1.00			Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CtE2:							
Clifton	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Too clayey	1.00			Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00
CxC:							
Clifton	50	Very limited		Somewhat limited		Very limited	
		Too clayey	1.00	Slope	0.63	Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00
		Slope	0.63			Slope	0.63
							0.63
Urban land	40	Not rated		Not rated		Not rated	
DeA:							
Dellwood	60	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Too sandy	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Gravel content	1.00
		Too sandy	1.00			Large stones content	0.14
		Large stones content	0.14			Depth to saturated zone	0.09
Reddies	30	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Too sandy	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Depth to saturated zone	0.24
		Too sandy	1.00			Gravel content	0.22
DrB:							
Dillard	80	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
		Seepage, bottom layer	1.00	Flooding	0.40	Depth to saturated zone	0.47
		Too clayey	0.50				
		Flooding	0.40				
DtD:							
Ditney	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Unicoi	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
		Large stones content	0.10			Large stones content	0.10
						Gravel content	0.01

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
DuE:							
Ditney	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Unicoi	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
		Large stones content	0.10			Large stones content	0.10
						Gravel content	0.01
DuF:							
Ditney	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Unicoi	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
		Large stones content	0.01			Gravel content	0.01
						Large stones content	0.01
EdD:							
Edneyville	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Chestnut	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
						Gravel content	0.01
EdE:							
Edneyville	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Chestnut	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
						Gravel content	0.01
EdF:							
Edneyville	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
EdF:							
Chestnut	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
						Gravel content	0.01
EfA:							
Ela, drained	65	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Ponding	1.00	Depth to saturated zone	1.00
		Ponding	1.00	Depth to saturated zone	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Seepage	1.00	Large stones content	0.01
		Large stones content	0.01			Gravel content	0.01
Ela, undrained	10	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Ponding	1.00	Depth to saturated zone	1.00
		Ponding	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Large stones content	0.57
		Large stones content	0.57				
EvD2:							
Evard	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cowee	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
						Gravel content	0.11
EvE2:							
Evard	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cowee	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
						Gravel content	0.11
EvF2:							
Evard	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cowee	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
						Gravel content	0.11
EwD:							
Evard	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
						Too clayey	0.50

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
EwD:							
Cowee	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too clayey	0.50			Too clayey	0.50
EwE:							
Evard	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
						Too clayey	0.50
Cowee	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too clayey	0.50			Too clayey	0.50
						Gravel content	0.01
EwF:							
Evard	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
						Too clayey	0.50
Cowee	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too clayey	0.50			Too clayey	0.50
						Gravel content	0.01
FnD2:							
Fannin	75	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
FrA:							
French	90	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Too sandy	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Depth to saturated zone	0.96
		Too sandy	1.00			Gravel content	0.16
HcE:							
Heintooga	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones	1.00	Seepage	1.00	Large stones	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
Chiltoskie	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
HpA:							
Hemphill, drained	80	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	0.40	Flooding	0.40	Too clayey	1.00

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
HpA:							
Hemphill, undrained	5	Very limited Depth to saturated zone Ponding Flooding	 1.00 1.00 0.40	Very limited Ponding Depth to saturated zone Flooding	 1.00 1.00 0.40	Very limited Ponding Depth to saturated zone Too clayey	 1.00 1.00 1.00
JbD:							
Junaluska	50	Very limited Slope Depth to bedrock Seepage, bottom layer	 1.00 1.00 1.00	Very limited Slope Depth to bedrock Seepage	 1.00 1.00 1.00	Very limited Slope Depth to bedrock	 1.00 1.00
Brasstown	40	Very limited Slope Depth to bedrock	 1.00 1.00	Very limited Slope Depth to bedrock	 1.00 0.84	Very limited Slope Depth to bedrock	 1.00 0.84
JbE:							
Junaluska	50	Very limited Slope Depth to bedrock Seepage, bottom layer	 1.00 1.00 1.00	Very limited Slope Depth to bedrock Seepage	 1.00 1.00 1.00	Very limited Slope Depth to bedrock	 1.00 1.00
Brasstown	40	Very limited Slope Depth to bedrock	 1.00 1.00	Very limited Slope Depth to bedrock	 1.00 0.84	Very limited Slope Depth to bedrock	 1.00 0.84
JbF:							
Junaluska	50	Very limited Slope Depth to bedrock Seepage, bottom layer	 1.00 1.00 1.00	Very limited Slope Depth to bedrock Seepage	 1.00 1.00 1.00	Very limited Slope Depth to bedrock	 1.00 1.00
Brasstown	40	Very limited Slope Depth to bedrock	 1.00 1.00	Very limited Slope Depth to bedrock	 1.00 0.84	Very limited Slope Depth to bedrock	 1.00 0.84
KnC:							
Keener	85	Very limited Seepage, bottom layer Slope	 1.00 0.63	Very limited Seepage Slope	 1.00 0.63	Somewhat limited Slope Seepage Too clayey	 0.63 0.50 0.50
MwC:							
Mars Hill	55	Very limited Depth to bedrock Seepage, bottom layer Slope	 1.00 1.00 0.63	Very limited Seepage Depth to bedrock Slope	 1.00 0.77 0.63	Somewhat limited Depth to bedrock Slope Seepage	 0.77 0.63 0.50
Walnut	35	Very limited Depth to bedrock Seepage, bottom layer Slope	 1.00 1.00 0.63	Very limited Depth to bedrock Seepage Slope	 1.00 1.00 0.63	Very limited Depth to bedrock Slope Seepage	 1.00 0.63 0.50

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MwD:							
Mars Hill	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	0.77
		Seepage, bottom layer	1.00	Depth to bedrock	0.77	Seepage	0.50
Walnut	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
MwE:							
Mars Hill	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	0.77
		Seepage, bottom layer	1.00	Depth to bedrock	0.77	Seepage	0.50
Walnut	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
MwF:							
Mars Hill	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	0.77
		Seepage, bottom layer	1.00	Depth to bedrock	0.77	Seepage	0.50
Walnut	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
MyB:							
Maymead	65	Very limited		Very limited		Somewhat limited	
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Northcove	25	Very limited		Very limited		Very limited	
		Large stones	1.00	Seepage	1.00	Large stones	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
NhC:							
Northcove	65	Very limited		Very limited		Very limited	
		Large stones	1.00	Seepage	1.00	Large stones	1.00
		Seepage, bottom layer	1.00	Slope	0.63	Slope	0.63
		Slope	0.63			Seepage	0.50
Maymead	25	Very limited		Very limited		Somewhat limited	
		Seepage, bottom layer	1.00	Seepage	1.00	Slope	0.63
		Slope	0.63	Slope	0.63	Seepage	0.50

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
NtD:							
Northcove-----------	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones	1.00	Seepage	1.00	Large stones	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
Maymead-------------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
NtE:							
Northcove-----------	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones	1.00	Seepage	1.00	Large stones	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
Maymead-------------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
OwC:							
Oconaluftee---------	45	Very limited		Very limited		Somewhat limited	
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
				Slope	0.37	Slope	0.37
		Slope	0.37				
Guyot---------------	25	Very limited		Very limited		Somewhat limited	
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Slope	0.37	Slope	0.37
				Depth to bedrock	0.14	Depth to bedrock	0.14
		Slope	0.37				
Cataloochee---------	20	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too acid	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Slope	0.37	Slope	0.37
		Slope	0.37				
OwD:							
Oconaluftee---------	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Guyot---------------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.14	Depth to bedrock	0.14
Cataloochee---------	20	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too acid	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00				

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
OwE:							
Oconaluftee---------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Guyot---------------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.14	Depth to bedrock	0.14
Cataloochee---------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too acid	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00				
OwF:							
Oconaluftee---------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Guyot---------------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.14	Depth to bedrock	0.14
Cataloochee---------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too acid	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00				
PwC:							
Porters-------------	40	Very limited		Very limited		Somewhat limited	
		Depth to bedrock	1.00	Seepage	1.00	Slope	0.63
		Seepage, bottom layer	1.00	Slope	0.63	Seepage	0.50
				Depth to bedrock	0.14	Depth to bedrock	0.14
		Slope	0.63			Gravel content	0.01
Unaka---------------	40	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Slope	0.63
				Slope	0.63	Seepage	0.50
		Slope	0.63				
PwD:							
Porters-------------	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.14	Depth to bedrock	0.14
						Gravel content	0.01

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
PwD:							
Unaka	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
PwE:							
Porters	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.14	Depth to bedrock	0.14
						Gravel content	0.01
Unaka	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
PxF:							
Porters	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.14	Depth to bedrock	0.14
						Gravel content	0.01
Unaka	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
RbA:							
Reddies	80	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Too sandy	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Depth to saturated zone	0.24
		Too sandy	1.00			Gravel content	0.21
RcF:							
Rock outcrop	55	Not rated		Not rated		Not rated	
Cataska	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	1.00
						Gravel content	0.99
RhD:							
Rock outcrop	60	Not rated		Not rated		Not rated	
Chestoa	30	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
RhF:							
Rock outcrop	65	Not rated		Not rated		Not rated	
Chestoa	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
RkF:							
Rock outcrop	60	Not rated		Not rated		Not rated	
Cleveland	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
RoF:							
Rock outcrop	60	Not rated		Not rated		Not rated	
Oteen	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
						Gravel content	0.01
RpF:							
Rock outcrop	45	Not rated		Not rated		Not rated	
Unicoi	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
		Large stones content	0.01			Large stones content	0.01
RsA:							
Rosman	80	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Seepage	0.50
		Depth to saturated zone	1.00	Depth to saturated zone	1.00		
		Seepage, bottom layer	1.00	Seepage	1.00		
SoD:							
Soco	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Stecoah	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	0.84
		Seepage, bottom layer	1.00	Depth to bedrock	0.84	Seepage	0.50

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SoE:							
Soco	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Stecoah	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.42	Depth to bedrock	0.42
SoF:							
Soco	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Stecoah	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	0.84
		Seepage, bottom layer	1.00	Depth to bedrock	0.84	Seepage	0.50
StB:							
Statler	85	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
		Too clayey	0.50	Flooding	0.40		
		Flooding	0.40				
SwD:							
Sylco	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Large stones content	0.97
		Large stones content	0.97			Seepage	0.21
Cataska	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	1.00
		Large stones content	0.98			Large stones content	0.98
SwE:							
Sylco	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Large stones content	0.97
		Large stones content	0.97			Seepage	0.21

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SwE:							
Cataska	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	1.00
		Large stones content	0.98			Large stones content	0.98
SyD:							
Sylco	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.21
						Gravel content	0.08
Soco	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
SyE:							
Sylco	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
						Gravel content	0.08
Soco	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
SzF:							
Sylco	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
						Gravel content	0.08
Soco	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
TaB:							
Tate	85	Very limited		Not limited		Somewhat limited	
		Seepage, bottom layer	1.00			Too clayey	0.50
		Too clayey	0.50				
TaC:							
Tate	85	Very limited		Somewhat limited		Somewhat limited	
		Seepage, bottom layer	1.00	Slope	0.63	Slope	0.63
		Slope	0.63			Too clayey	0.50
		Too clayey	0.50				

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
TaD:							
Tate	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Too clayey	0.50
		Too clayey	0.50				
TkC:							
Tate	85	Very limited		Somewhat limited		Somewhat limited	
		Seepage, bottom layer	1.00	Slope	0.63	Slope	0.63
						Gravel content	0.04
		Slope	0.63				
TkD:							
Tate	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Gravel content	0.04
TmC:							
Tate	50	Very limited		Somewhat limited		Somewhat limited	
		Seepage, bottom layer	1.00	Slope	0.04	Too clayey	0.50
						Slope	0.04
		Too clayey	0.50				
		Slope	0.04				
Urban land	40	Not rated		Not rated		Not rated	
ToD:							
Toecane	80	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones	1.00	Seepage	1.00	Large stones	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
						Too sandy	0.50
		Too sandy	0.50				
ToE:							
Toecane	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones	1.00	Seepage	1.00	Large stones	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
						Too sandy	0.50
		Too sandy	0.50				
TrC:							
Toecane	50	Very limited		Very limited		Very limited	
		Large stones	1.00	Seepage	1.00	Large stones	1.00
		Seepage, bottom layer	1.00	Slope	0.63	Slope	0.63
						Seepage	0.50
		Slope	0.63			Too sandy	0.50
		Too sandy	0.50				
Tusquitee	40	Very limited		Very limited		Somewhat limited	
		Seepage, bottom layer	1.00	Seepage	1.00	Slope	0.63
				Slope	0.63	Seepage	0.50
		Slope	0.63				

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
TsD:							
Toecane	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones	1.00	Seepage	1.00	Large stones	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
		Too sandy	0.50			Too sandy	0.50
Tusquitee	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
TsE:							
Toecane	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones	1.00	Seepage	1.00	Large stones	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
		Too sandy	0.50			Too sandy	0.50
Tusquitee	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
TuD:							
Tusquitee	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Toecane	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones	1.00	Seepage	1.00	Large stones	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
		Too sandy	0.50			Too sandy	0.50
TwB:							
Tusquitee	55	Very limited		Very limited		Somewhat limited	
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Whiteside	35	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.47
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.21
TwC:							
Tusquitee	55	Very limited		Very limited		Somewhat limited	
		Seepage, bottom layer	1.00	Seepage	1.00	Slope	0.63
		Slope	0.63	Slope	0.63	Seepage	0.50

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
TwC:							
Whiteside-----------	35	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	0.63
		Seepage, bottom layer	1.00	Seepage	1.00	Depth to saturated zone	0.47
		Slope	0.63	Slope	0.63	Seepage	0.21
UcB:							
Udifluvents---------	95	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Too sandy	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Seepage	1.00		
		Too sandy	1.00				
Ud:							
Udorthents----------	85	Very limited		Very limited		Somewhat limited	
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.21
UfB:							
Udorthents----------	60	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Seepage	0.21
		Seepage, bottom layer	1.00	Seepage	1.00		
Urban land----------	30	Not rated		Not rated		Not rated	
UhE:							
Udorthents----------	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.21
Urban land----------	35	Not rated		Not rated		Not rated	
UkE:							
Unaka---------------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Rock outcrop--------	35	Not rated		Not rated		Not rated	
UkF:							
Unaka---------------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Rock outcrop--------	35	Not rated		Not rated		Not rated	

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
UrD:							
Unicoi	60	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
		Large stones content	0.01			Large stones content	0.01
Rock outcrop	30	Not rated		Not rated		Not rated	
UsB:							
Unison	90	Very limited		Not limited		Very limited	
		Too clayey	1.00			Too clayey	1.00
		Seepage, bottom layer	1.00				
UsC:							
Unison	80	Very limited		Somewhat limited		Very limited	
		Too clayey	1.00	Slope	0.63	Too clayey	1.00
		Seepage, bottom layer	1.00			Slope	0.63
		Slope	0.63				
UsD:							
Unison	80	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Too clayey	1.00			Too clayey	1.00
		Seepage, bottom layer	1.00				
W:							
Water	100	Not rated		Not rated		Not rated	
WaC2:							
Walnut	40	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Slope	0.63
		Slope	0.63	Slope	0.63	Seepage	0.50
Oteen	35	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Slope	0.63	Slope	0.63
		Slope	0.63			Seepage	0.50
						Gravel content	0.01
Mars Hill	20	Very limited		Very limited		Somewhat limited	
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	0.77
		Seepage, bottom layer	1.00	Depth to bedrock	0.77	Slope	0.63
		Slope	0.63	Slope	0.63	Seepage	0.50
WaD2:							
Walnut	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
WaD2:							
Oteen---------------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
						Gravel content	0.01
Mars Hill-----------	20	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	0.77
		Seepage, bottom layer	1.00	Depth to bedrock	0.77	Seepage	0.50
WaE2:							
Walnut--------------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Oteen---------------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
						Gravel content	0.01
Mars Hill-----------	20	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	0.77
		Seepage, bottom layer	1.00	Depth to bedrock	0.77	Seepage	0.50
WoF:							
Walnut--------------	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Oteen---------------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
						Gravel content	0.01
Rock outcrop--------	20	Not rated		Not rated		Not rated	
WrC:							
Wayah---------------	50	Very limited		Very limited		Somewhat limited	
		Seepage, bottom layer	1.00	Seepage	1.00	Slope	0.63
		Slope	0.63	Slope	0.63	Seepage	0.50
Burton--------------	40	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Slope	0.63
		Slope	0.63	Slope	0.63	Seepage	0.50

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
WrD:							
Wayah	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Burton	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
WrE:							
Wayah	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Burton	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
WsF:							
Wayah	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Burton	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
WtB:							
Whiteside	90	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.47
		Seepage, bottom layer	1.00				

Table 15.—Construction Materials, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The ratings given for the thickest layer are for the thickest layer above and excluding the bottom layer. The numbers in the value columns range from 0.00 to 0.99. The greater the value, the greater the likelihood that the bottom layer or thickest layer of the soil is a source of sand or gravel. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
AcD:					
Ashe----------------	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.02
		Thickest layer	0.00	Bottom layer	0.03
Cleveland-----------	30	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
Rock outcrop--------	20	Not rated		Not rated	
ArE:					
Ashe----------------	40	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.02
		Bottom layer	0.00	Bottom layer	0.03
Cleveland-----------	30	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.04
Rock outcrop--------	20	Not rated		Not rated	
ArF:					
Ashe----------------	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.02
		Thickest layer	0.00	Bottom layer	0.03
Cleveland-----------	30	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.04
Rock outcrop--------	20	Not rated		Not rated	
BaA:					
Biltmore------------	90	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.08
		Thickest layer	0.00	Bottom layer	0.86
BkB2:					
Braddock------------	80	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
BkC2:					
Braddock------------	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
BkD2:					
Braddock------------	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 15.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
BnD:					
Buladean------------	50	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.06
		Thickest layer	0.00	Thickest layer	0.06
Chestnut------------	45	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
BnE:					
Buladean------------	50	Poor		Fair	
		Thickest layer	0.00	Bottom layer	0.06
		Bottom layer	0.00	Thickest layer	0.06
Chestnut------------	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
BnF:					
Buladean------------	50	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.06
		Thickest layer	0.00	Thickest layer	0.06
Chestnut------------	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
CaD:					
Calvin--------------	75	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
CaE:					
Calvin--------------	80	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
CaF:					
Calvin--------------	80	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
CfF:					
Cataska-------------	40	Fair		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.44	Thickest layer	0.00
Sylco---------------	30	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Rock outcrop--------	20	Not rated		Not rated	
ChD:					
Cheoah--------------	55	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Jeffrey-------------	30	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00

Table 15.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
ChE:					
Cheoah	55	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Jeffrey	30	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
ChF:					
Cheoah	60	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Jeffrey	30	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
CsD:					
Chestoa	85	Poor		Fair	
		Thickest layer	0.00	Bottom layer	0.04
		Bottom layer	0.00	Thickest layer	0.04
CsE:					
Chestoa	85	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.04
		Thickest layer	0.00	Thickest layer	0.04
CsF:					
Chestoa	80	Poor		Fair	
		Thickest layer	0.00	Bottom layer	0.04
		Bottom layer	0.00	Thickest layer	0.04
CtB2:					
Clifton	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
CtC2:					
Clifton	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
CtD2:					
Clifton	80	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
CtE2:					
Clifton	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
CxC:					
Clifton	50	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Urban land	40	Not rated		Not rated	

Table 15.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
DeA:					
Dellwood	60	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.03
		Thickest layer	0.00	Thickest layer	0.03
Reddies	30	Fair		Fair	
		Thickest layer	0.00	Thickest layer	0.02
		Bottom layer	0.15	Bottom layer	0.29
DrB:					
Dillard	80	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
DtD:					
Ditney	55	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.02
		Thickest layer	0.00	Thickest layer	0.02
Unicoi	35	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
DuE:					
Ditney	50	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.02
		Thickest layer	0.00	Thickest layer	0.02
Unicoi	30	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
DuF:					
Ditney	45	Poor		Fair	
		Thickest layer	0.00	Bottom layer	0.02
		Bottom layer	0.00	Thickest layer	0.02
Unicoi	35	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
EdD:					
Edneyville	50	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.02
		Thickest layer	0.00	Bottom layer	0.04
Chestnut	35	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.01
		Thickest layer	0.00	Thickest layer	0.01
EdE:					
Edneyville	55	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.02
		Bottom layer	0.00	Bottom layer	0.04
Chestnut	25	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.01
		Thickest layer	0.00	Thickest layer	0.01

Table 15.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
EdF:					
Edneyville----------	45	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.02
		Bottom layer	0.00	Bottom layer	0.04
Chestnut------------	35	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.01
		Thickest layer	0.00	Thickest layer	0.01
EfA:					
Ela-----------------	75	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.03
EvD2:					
Evard---------------	55	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
Cowee---------------	35	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
EvE2:					
Rvard---------------	55	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.04
Cowee---------------	35	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
EvF2:					
Evard---------------	50	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.04
Cowee---------------	30	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
EwD:					
Evard---------------	55	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.04
Cowee---------------	25	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
EwE:					
Evard---------------	55	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.04
Cowee---------------	25	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 15.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
EwF:					
Evard	55	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
Cowee	25	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
FnD2:					
Fannin	75	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.01
FrA:					
French	90	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.14
HcE:					
Heintooga	55	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Chiltoskie	35	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
HpA:					
Hemphill	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
JbD:					
Junaluska	50	Not rated		Not rated	
Brasstown	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
JbE:					
Junaluska	50	Not rated		Not rated	
Brasstown	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
JbF:					
Junaluska	50	Not rated		Not rated	
Brasstown	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
KnC:					
Keener	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 15.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
MwC:					
Mars Hill-----------	55	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.02
		Thickest layer	0.00	Thickest layer	0.02
Walnut--------------	35	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
MwD:					
Mars Hill-----------	55	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.02
		Thickest layer	0.00	Thickest layer	0.02
Walnut--------------	35	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
MwE:					
Mars Hill-----------	55	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.02
		Thickest layer	0.00	Thickest layer	0.02
Walnut--------------	35	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
MwF:					
Mars Hill-----------	55	Poor		Fair	
		Thickest layer	0.00	Bottom layer	0.02
		Bottom layer	0.00	Thickest layer	0.02
Walnut--------------	35	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.02
MyB:					
Maymead-------------	65	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Northcove-----------	25	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.03
NhC:					
Northcove-----------	65	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.03
Maymead-------------	25	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
NtD:					
Northcove-----------	60	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.03

Table 15.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
NtD:					
Maymead-------------	30	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
NtE:					
Northcove-----------	45	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.03
Maymead-------------	35	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
OwC:					
Oconaluftee---------	45	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Guyot---------------	25	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.01
		Thickest layer	0.00	Thickest layer	0.01
Cataloochee---------	20	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.01
		Thickest layer	0.00	Thickest layer	0.01
OwD:					
Oconaluftee---------	45	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Guyot---------------	25	Poor		Fair	
		Thickest layer	0.00	Bottom layer	0.01
		Bottom layer	0.00	Thickest layer	0.01
Cataloochee---------	20	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.01
		Thickest layer	0.00	Thickest layer	0.01
OwE:					
Oconaluftee---------	35	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Guyot---------------	30	Poor		Fair	
		Thickest layer	0.00	Bottom layer	0.01
		Bottom layer	0.00	Thickest layer	0.01
Cataloochee---------	25	Poor		Fair	
		Thickest layer	0.00	Bottom layer	0.01
		Bottom layer	0.00	Thickest layer	0.01
OwF:					
Oconaluftee---------	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 15.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
OwF:					
Guyot----------------	35	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.01
		Thickest layer	0.00	Thickest layer	0.01
Cataloochee----------	25	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.01
		Thickest layer	0.00	Thickest layer	0.01
PwC:					
Porters--------------	40	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Unaka----------------	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
PwD:					
Porters--------------	60	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Unaka----------------	30	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
PwE:					
Porters--------------	50	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Unaka----------------	30	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
PxF:					
Porters--------------	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Unaka----------------	35	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
RbA:					
Reddies--------------	80	Fair		Fair	
		Thickest layer	0.00	Thickest layer	0.02
		Bottom layer	0.15	Bottom layer	0.29
RcF:					
Rock outcrop---------	55	Not rated		Not rated	
Cataska--------------	30	Fair		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.44	Thickest layer	0.00

Table 15.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
RhD:					
Rock outcrop--------	60	Not rated		Not rated	
Chestoa-------------	30	Poor		Fair	
		Thickest layer	0.00	Bottom layer	0.04
		Bottom layer	0.00	Thickest layer	0.04
RhF:					
Rock outcrop--------	65	Not rated		Not rated	
Chestoa-------------	25	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.04
		Thickest layer	0.00	Thickest layer	0.04
RkF:					
Rock outcrop--------	60	Not rated		Not rated	
Cleveland-----------	30	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.04
RoF:					
Rock outcrop--------	60	Not rated		Not rated	
Oteen---------------	30	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.04
RpF:					
Rock outcrop--------	45	Not rated		Not rated	
Unicoi--------------	40	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
RsA:					
Rosman--------------	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
SoD:					
Soco----------------	50	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Stecoah-------------	40	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
SoE:					
Soco----------------	65	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Stecoah-------------	25	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00

Table 15.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
SoF:					
Soco	45	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Stecoah	35	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
StB:					
Statler	85	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
SwD:					
Sylco	60	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Cataska	30	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
SwE:					
Sylco	45	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Cataska	35	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
SyD:					
Sylco	55	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Soco	40	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
SyE:					
Sylco	55	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Soco	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
SzF:					
Sylco	50	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Soco	35	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 15.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
TaB:					
Tate	85	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
TaC:					
Tate	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
TaD:					
Tate	85	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
TkC:					
Tate	85	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
TkD:					
Tate	85	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
TmC:					
Tate	50	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.01
Urban land	40	Not rated		Not rated	
ToD:					
Toecane	80	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
ToE:					
Toecane	85	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
TrC:					
Toecane	50	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
Tusquitee	40	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.02
TsD:					
Toecane	50	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
Tusquitee	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02

Table 15.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
TsE:					
Toecane	55	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
Tusquitee	35	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
TuD:					
Tusquitee	65	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
Toecane	25	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
TwB:					
Tusquitee	55	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.02
Whiteside	35	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.01
TwC:					
Tusquitee	55	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
Whiteside	35	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.01
UcB:					
Udifluvents	95	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.86
		Thickest layer	0.00	Thickest layer	0.86
Ud:					
Udorthents	85	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
UfB:					
Udorthents	60	Poor		Fair	
		Thickest layer	0.00	Bottom layer	0.03
		Bottom layer	0.00	Thickest layer	0.03
Urban land	30	Not rated		Not rated	
UhE:					
Udorthents	55	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.03
		Thickest layer	0.00	Thickest layer	0.03
Urban land	35	Not rated		Not rated	

Table 15.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
UkE:					
Unaka	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Rock outcrop	35	Not rated		Not rated	
UkF:					
Unaka	40	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Rock outcrop	35	Not rated		Not rated	
UrD:					
Unicoi	60	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
Rock outcrop	30	Not rated		Not rated	
UsB:					
Unison	90	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
UsC:					
Unison	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
UsD:					
Unison	80	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
W:					
Water	100	Not rated		Not rated	
WaC2:					
Walnut	40	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.02
Oteen	35	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.04
Mars Hill	20	Poor		Fair	
		Thickest layer	0.00	Bottom layer	0.02
		Bottom layer	0.00	Thickest layer	0.02
WaD2:					
Walnut	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
Oteen	35	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04

Table 15.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
WaD2:					
Mars Hill	20	Poor		Fair	
		Thickest layer	0.00	Bottom layer	0.02
		Bottom layer	0.00	Thickest layer	0.02
WaE2:					
Walnut	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
Oteen	35	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.04
Mars Hill	20	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.02
		Thickest layer	0.00	Thickest layer	0.02
WoF:					
Walnut	45	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.02
Oteen	35	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.04
Rock outcrop	20	Not rated		Not rated	
WrC:					
Wayah	50	Poor		Fair	
		Thickest layer	0.00	Bottom layer	0.03
		Bottom layer	0.00	Thickest layer	0.04
Burton	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
WrD:					
Wayah	50	Poor		Fair	
		Thickest layer	0.00	Bottom layer	0.03
		Bottom layer	0.00	Thickest layer	0.04
Burton	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
WrE:					
Wayah	50	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.03
		Thickest layer	0.00	Thickest layer	0.04
Burton	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02

Table 15.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
WsF:					
Wayah	60	Poor		Fair	
		Thickest layer	0.00	Bottom layer	0.03
		Bottom layer	0.00	Thickest layer	0.04
Burton	30	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
WtB:					
Whiteside	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 15.—Construction Materials, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AcD:							
Ashe	40	Fair		Poor		Poor	
		Droughty	0.13	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Slope	0.08	Depth to bedrock	0.54
		Organic matter content low	0.50			Rock fragments	0.76
						Too acid	0.76
		Depth to bedrock	0.54				
Cleveland	30	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.08	Depth to bedrock	0.00
		Organic matter content low	0.50			Rock fragments	0.68
						Too acid	0.98
		Too acid	0.54				
Rock outcrop	20	Not rated		Not rated		Not rated	
ArE:							
Ashe	40	Fair		Poor		Poor	
		Droughty	0.13	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.00	Depth to bedrock	0.54
		Organic matter content low	0.50			Rock fragments	0.76
						Too acid	0.76
		Depth to bedrock	0.54				
Cleveland	30	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Depth to bedrock	0.00
		Organic matter content low	0.50			Rock fragments	0.68
						Too acid	0.98
		Too acid	0.54				
Rock outcrop	20	Not rated		Not rated		Not rated	
ArF:							
Ashe	40	Fair		Poor		Poor	
		Droughty	0.13	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.00	Depth to bedrock	0.54
		Organic matter content low	0.50			Rock fragments	0.76
						Too acid	0.76
		Depth to bedrock	0.54				
Cleveland	30	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Depth to bedrock	0.00
		Organic matter content low	0.50			Rock fragments	0.68
						Too acid	0.98
		Too acid	0.54				
Rock outcrop	20	Not rated		Not rated		Not rated	

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BaA:							
Biltmore	90	Poor		Good		Poor	
		Too sandy	0.00			Too sandy	0.00
		Wind erosion	0.00			Rock fragments	0.99
		Organic matter content low	0.12				
BkB2:							
Braddock	80	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Too acid	0.12	Shrink-swell	0.90	Too acid	0.59
		Organic matter content low	0.50			Rock fragments	0.68
BkC2:							
Braddock	80	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Too acid	0.12	Shrink-swell	0.90	Slope	0.37
		Organic matter content low	0.50			Too acid	0.59
						Rock fragments	0.68
BkD2:							
Braddock	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Slope	0.00
		Too acid	0.12	Slope	0.08	Too clayey	0.00
		Organic matter content low	0.50	Shrink-swell	0.90	Too acid	0.59
						Rock fragments	0.68
BnD:							
Buladean	50	Fair		Fair		Poor	
		Organic matter content low	0.12	Slope	0.08	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.58	Too acid	0.76
						Rock fragments	0.98
Chestnut	45	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.26	Slope	0.08	Depth to bedrock	0.26
		Too acid	0.50			Too acid	0.76
		Organic matter content low	0.50			Rock fragments	0.88
BnE:							
Buladean	50	Fair		Poor		Poor	
		Organic matter content low	0.12	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.58	Too acid	0.76
						Rock fragments	0.98
Chestnut	40	Poor		Poor		Poor	
		Droughty	0.00	Slope	0.00	Slope	0.00
		Depth to bedrock	0.26	Depth to bedrock	0.00	Depth to bedrock	0.26
		Too acid	0.50			Too acid	0.76
		Organic matter content low	0.50			Rock fragments	0.88
BnF:							
Buladean	50	Fair		Poor		Poor	
		Organic matter content low	0.12	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.58	Too acid	0.76
						Rock fragments	0.98

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BnF:							
Chestnut------------	40	Poor		Poor		Poor	
		Droughty	0.00	Slope	0.00	Slope	0.00
		Depth to bedrock	0.26	Depth to bedrock	0.00	Depth to bedrock	0.26
		Too acid	0.50			Too acid	0.76
		Organic matter content low	0.50			Rock fragments	0.88
CaD:							
Calvin-------------	75	Fair		Poor		Poor	
		Droughty	0.06	Depth to bedrock	0.00	Slope	0.00
		Organic matter content low	0.12	Slope	0.08	Rock fragments	0.00
		Too acid	0.50	Cobble content	0.24	Too acid	0.50
		Stone content	0.70	Stone content	0.83	Depth to bedrock	0.90
		Cobble content	0.86				
		Depth to bedrock	0.90				
CaE:							
Calvin-------------	80	Fair		Poor		Poor	
		Droughty	0.06	Slope	0.00	Slope	0.00
		Organic matter content low	0.12	Depth to bedrock	0.00	Rock fragments	0.00
		Too acid	0.50	Cobble content	0.24	Too acid	0.50
		Stone content	0.70	Stone content	0.83	Depth to bedrock	0.90
		Cobble content	0.86				
		Depth to bedrock	0.90				
CaF:							
Calvin-------------	80	Fair		Poor		Poor	
		Droughty	0.06	Slope	0.00	Slope	0.00
		Organic matter content low	0.12	Depth to bedrock	0.00	Rock fragments	0.00
		Too acid	0.50	Cobble content	0.24	Too acid	0.50
		Stone content	0.70	Stone content	0.83	Depth to bedrock	0.90
		Cobble content	0.86				
		Depth to bedrock	0.90				
CfF:							
Cataska------------	40	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Rock fragments	0.00
		Too acid	0.50			Depth to bedrock	0.00
						Too acid	0.59
Sylco--------------	30	Poor		Poor		Poor	
		Droughty	0.00	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.00	Depth to bedrock	0.54
		Organic matter content low	0.50	Low strength	0.00	Too acid	0.88
		Depth to bedrock	0.54				
Rock outcrop--------	20	Not rated		Not rated		Not rated	
ChD:							
Cheoah-------------	55	Fair		Fair		Poor	
		Too acid	0.50	Slope	0.08	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.68	Too acid	0.50

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
ChD:							
Jeffrey-------------	30	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.00
		Organic matter content low	0.50	Slope	0.08	Too acid	0.50
		Depth to bedrock	0.65			Depth to bedrock	0.65
		Droughty	0.73				
ChE:							
Cheoah--------------	55	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.68	Too acid	0.50
Jeffrey-------------	30	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.00	Too acid	0.50
		Depth to bedrock	0.65			Depth to bedrock	0.65
		Droughty	0.73				
ChF:							
Cheoah--------------	60	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.68	Too acid	0.50
Jeffrey-------------	30	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.00	Too acid	0.50
		Depth to bedrock	0.65			Depth to bedrock	0.65
		Droughty	0.73				
CsD:							
Chestoa-------------	85	Fair		Poor		Poor	
		Droughty	0.07	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.21	Slope	0.08	Depth to bedrock	0.21
		Too acid	0.50			Too acid	0.50
CsE:							
Chestoa-------------	85	Fair		Poor		Poor	
		Droughty	0.07	Slope	0.00	Slope	0.00
		Depth to bedrock	0.21	Depth to bedrock	0.00	Depth to bedrock	0.21
		Too acid	0.50			Too acid	0.50
CsF:							
Chestoa-------------	80	Fair		Poor		Poor	
		Droughty	0.07	Slope	0.00	Slope	0.00
		Depth to bedrock	0.21	Depth to bedrock	0.00	Depth to bedrock	0.21
		Too acid	0.50			Too acid	0.50
CtB2:							
Clifton-------------	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Organic matter content low	0.50	Shrink-swell	0.91	Rock fragments	0.99
		Too acid	0.68				

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CtC2:							
Clifton	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Organic matter content low	0.50	Shrink-swell	0.91	Slope	0.37
						Rock fragments	0.99
		Too acid	0.68				
CtD2:							
Clifton	80	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Slope	0.00
		Organic matter content low	0.50	Slope	0.08	Too clayey	0.00
				Shrink-swell	0.91	Rock fragments	0.99
		Too acid	0.68				
CtE2:							
Clifton	85	Poor		Poor		Poor	
		Too clayey	0.00	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Low strength	0.00	Too clayey	0.00
				Shrink-swell	0.91	Rock fragments	0.99
		Too acid	0.68				
CxC:							
Clifton	50	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Organic matter content low	0.50	Shrink-swell	0.91	Slope	0.37
						Rock fragments	0.90
		Too acid	0.68				
Urban land	40	Not rated		Not rated		Not rated	
DeA:							
Dellwood	60	Poor		Fair		Poor	
		Too sandy	0.00	Cobble content	0.52	Too sandy	0.00
		Droughty	0.12			Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.12				
						Rock fragments	0.00
		Too acid	0.88				
		Cobble content	0.95				
Reddies	30	Fair		Fair		Poor	
		Organic matter content low	0.12	Wetness depth	0.98	Hard to reclaim (rock fragments)	0.00
		Too acid	0.88			Rock fragments	0.82
		Droughty	0.97			Wetness depth	0.98
DrB:							
Dillard	80	Fair		Poor		Fair	
		Too acid	0.32	Low strength	0.00	Too acid	0.88
		Organic matter content low	0.50	Wetness depth	0.89	Wetness depth	0.89
DtD:							
Ditney	55	Fair		Poor		Poor	
		Droughty	0.15	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Slope	0.08	Depth to bedrock	0.54
		Organic matter content low	0.50			Too acid	0.59
						Rock fragments	0.88
		Depth to bedrock	0.54				

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
DtD:							
Unicoi	35	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.08	Depth to bedrock	0.00
		Too acid	0.50			Rock fragments	0.00
		Organic matter content low	0.50			Too acid	0.59
		Cobble content	0.93				
DuE:							
Ditney	50	Fair		Poor		Poor	
		Droughty	0.15	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.00	Depth to bedrock	0.54
		Organic matter content low	0.50			Too acid	0.59
		Depth to bedrock	0.54			Rock fragments	0.88
Unicoi	30	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Depth to bedrock	0.00
		Too acid	0.50			Rock fragments	0.00
		Organic matter content low	0.50			Too acid	0.59
		Cobble content	0.93				
DuF:							
Ditney	45	Fair		Poor		Poor	
		Droughty	0.15	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.00	Depth to bedrock	0.54
		Organic matter content low	0.50			Too acid	0.59
		Depth to bedrock	0.54			Rock fragments	0.88
Unicoi	35	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Depth to bedrock	0.00
		Too acid	0.50			Rock fragments	0.00
		Organic matter content low	0.50			Too acid	0.59
EdD:							
Edneyville	50	Fair		Fair		Poor	
		Too acid	0.08	Slope	0.08	Slope	0.00
		Organic matter content low	0.50			Too acid	0.50
						Rock fragments	0.68
						Hard to reclaim (rock fragments)	0.98
Chestnut	35	Fair		Poor		Poor	
		Droughty	0.09	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Slope	0.08	Rock fragments	0.00
		Organic matter content low	0.50			Too acid	0.76
		Depth to bedrock	0.93			Depth to bedrock	0.93

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
EdE:							
Edneyville----------	55	Fair		Poor		Poor	
		Too acid	0.08	Slope	0.00	Slope	0.00
		Organic matter content low	0.50			Too acid	0.50
						Rock fragments	0.68
						Hard to reclaim (rock fragments)	0.98
Chestnut------------	25	Fair		Poor		Poor	
		Droughty	0.09	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.00	Rock fragments	0.00
		Organic matter content low	0.50			Too acid	0.76
		Depth to bedrock	0.93			Depth to bedrock	0.93
EdF:							
Edneyville----------	45	Fair		Poor		Poor	
		Too acid	0.08	Slope	0.00	Slope	0.00
		Organic matter content low	0.50			Too acid	0.50
						Rock fragments	0.68
						Hard to reclaim (rock fragments)	0.98
Chestnut------------	35	Fair		Poor		Poor	
		Droughty	0.09	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.00	Rock fragments	0.00
		Organic matter content low	0.50			Too acid	0.76
		Depth to bedrock	0.93			Depth to bedrock	0.93
EfA:							
Ela, drained--------	65	Fair		Poor		Poor	
		Organic matter content low	0.12	Wetness depth	0.00	Wetness depth	0.00
		Stone content	0.42			Hard to reclaim (rock fragments)	0.00
		Too acid	0.68			Rock fragments	0.00
Ela, undrained------	10	Fair		Poor		Poor	
		Organic matter content low	0.12	Wetness depth	0.00	Wetness depth	0.00
		Stone content	0.55	Cobble content	0.98	Hard to reclaim (rock fragments)	0.00
		Too acid	0.68			Rock fragments	0.99
		Cobble content	0.94				
EvD2:							
Evard---------------	55	Fair		Fair		Poor	
		Organic matter content low	0.12	Slope	0.08	Slope	0.00
		Too acid	0.54			Rock fragments	0.95
						Too acid	0.98
Cowee---------------	35	Fair		Poor		Poor	
		Droughty	0.23	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.26	Slope	0.08	Rock fragments	0.00
		Too acid	0.50			Depth to bedrock	0.26
		Organic matter content low	0.50			Too acid	0.76

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
EvE2:							
Evard---------------	55	Fair		Poor		Poor	
		Organic matter content low	0.12	Slope	0.00	Slope	0.00
		Too acid	0.54			Rock fragments	0.95
						Too acid	0.98
Cowee---------------	35	Fair		Poor		Poor	
		Droughty	0.23	Slope	0.00	Slope	0.00
		Depth to bedrock	0.26	Depth to bedrock	0.00	Rock fragments	0.00
		Too acid	0.50			Depth to bedrock	0.26
		Organic matter content low	0.50			Too acid	0.76
EvF2:							
Evard---------------	50	Fair		Poor		Poor	
		Organic matter content low	0.12	Slope	0.00	Slope	0.00
		Too acid	0.54			Rock fragments	0.95
						Too acid	0.98
Cowee---------------	30	Fair		Poor		Poor	
		Droughty	0.23	Slope	0.00	Slope	0.00
		Depth to bedrock	0.26	Depth to bedrock	0.00	Rock fragments	0.00
		Too acid	0.50			Depth to bedrock	0.26
		Organic matter content low	0.50			Too acid	0.76
EwD:							
Evard---------------	55	Fair		Fair		Poor	
		Organic matter content low	0.50	Slope	0.08	Slope	0.00
		Too acid	0.54			Too clayey	0.60
		Too clayey	0.92			Rock fragments	0.95
						Hard to reclaim (rock fragments)	0.98
						Too acid	0.98
Cowee---------------	25	Fair		Poor		Poor	
		Organic matter content low	0.50	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.54	Slope	0.08	Rock fragments	0.82
		Depth to bedrock	0.99			Too acid	0.98
		Droughty	0.99			Depth to bedrock	0.99
EwE:							
Evard---------------	55	Fair		Poor		Poor	
		Organic matter content low	0.50	Slope	0.00	Slope	0.00
		Too acid	0.54			Too clayey	0.60
		Too clayey	0.92			Rock fragments	0.95
						Hard to reclaim (rock fragments)	0.98
						Too acid	0.98
Cowee---------------	25	Fair		Poor		Poor	
		Too acid	0.54	Slope	0.00	Slope	0.00
		Organic matter content low	0.88	Depth to bedrock	0.00	Rock fragments	0.00
		Depth to bedrock	0.99			Too acid	0.98
		Droughty	0.99			Depth to bedrock	0.99

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
EwF:							
Evard	55	Fair Organic matter content low Too acid Too clayey	 0.50 0.54 0.92	Poor Slope	 0.00	Poor Slope Too clayey Rock fragments Hard to reclaim (rock fragments) Too acid	 0.00 0.60 0.95 0.98 0.98
Cowee	25	Fair Too acid Organic matter content low Depth to bedrock Droughty	 0.54 0.88 0.99 0.99	Poor Slope Depth to bedrock	 0.00 0.00	Poor Slope Rock fragments Too acid Depth to bedrock	 0.00 0.00 0.98 0.99
FnD2:							
Fannin	75	Fair Organic matter content low Too acid	 0.12 0.50	Fair Slope	 0.08	Poor Slope Too acid Rock fragments	 0.00 0.92 0.99
FrA:							
French	90	Fair Organic matter content low Too acid	 0.12 0.84	Fair Wetness depth	 0.29	Poor Hard to reclaim (rock fragments) Wetness depth Rock fragments	 0.00 0.29 0.95
HcE:							
Heintooga	55	Poor Cobble content Stone content Organic matter content low Too acid	 0.00 0.04 0.12 0.50	Poor Slope Stone content Cobble content	 0.00 0.00 0.00	Poor Slope Hard to reclaim (rock fragments) Rock fragments Too acid	 0.00 0.00 0.00 0.82
Chiltoskie	35	Poor Too acid Organic matter content low	 0.00 0.50	Poor Slope	 0.00	Poor Slope Hard to reclaim (rock fragments) Too acid Rock fragments	 0.00 0.00 0.59 0.97
HpA:							
Hemphill	85	Poor Too clayey Organic matter content low Too acid	 0.00 0.12 0.88	Poor Wetness depth Low strength	 0.00 0.78	Poor Wetness depth Too clayey	 0.00 0.00
JbD:							
Junaluska	50	Poor Droughty Depth to bedrock Too acid Organic matter content low	 0.00 0.26 0.50 0.50	Poor Depth to bedrock Slope	 0.00 0.08	Poor Slope Depth to bedrock Too acid Rock fragments	 0.00 0.26 0.76 0.88

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
JbD:							
Brasstown-----------	40	Fair		Poor		Poor	
		Too acid	0.50	Low strength	0.00	Slope	0.00
		Organic matter	0.50	Slope	0.08	Too acid	0.76
		content low		Depth to bedrock	0.16	Rock fragments	0.99
						Hard to reclaim	0.99
						(rock fragments)	
JbE:							
Junaluska-----------	50	Poor		Poor		Poor	
		Droughty	0.00	Slope	0.00	Slope	0.00
		Depth to bedrock	0.26	Depth to bedrock	0.00	Depth to bedrock	0.26
		Too acid	0.50			Too acid	0.76
		Organic matter	0.50			Rock fragments	0.88
		content low					
Brasstown-----------	40	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter	0.50	Low strength	0.00	Too acid	0.76
		content low		Depth to bedrock	0.16	Rock fragments	0.99
						Hard to reclaim	0.99
						(rock fragments)	
JbF:							
Junaluska-----------	50	Poor		Poor		Poor	
		Droughty	0.00	Slope	0.00	Slope	0.00
		Depth to bedrock	0.26	Depth to bedrock	0.00	Depth to bedrock	0.26
		Too acid	0.50			Too acid	0.76
		Organic matter	0.50			Rock fragments	0.88
		content low					
Brasstown-----------	40	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter	0.50	Low strength	0.00	Too acid	0.76
		content low		Depth to bedrock	0.16	Rock fragments	0.99
						Hard to reclaim	0.99
						(rock fragments)	
KnC:							
Keener--------------	85	Fair		Good		Fair	
		Organic matter	0.12			Slope	0.37
		content low				Hard to reclaim	0.39
		Too acid	0.50			(rock fragments)	
						Too acid	0.76
						Rock fragments	0.88
MwC:							
Mars Hill-----------	55	Fair		Fair		Fair	
		Too acid	0.50	Depth to bedrock	0.23	Slope	0.37
		Organic matter	0.50			Rock fragments	0.76
		content low				Too sandy	0.99
		Too sandy	0.99				
Walnut--------------	35	Fair		Poor		Fair	
		Droughty	0.10	Depth to bedrock	0.00	Depth to bedrock	0.26
		Depth to bedrock	0.26			Slope	0.37
		Too acid	0.50			Rock fragments	0.76
		Organic matter	0.50				
		content low					

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MwD:							
Mars Hill	55	Fair		Fair		Poor	
		Too acid	0.50	Slope	0.08	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.23	Rock fragments	0.76
		Too sandy	0.99			Too sandy	0.99
Walnut	35	Fair		Poor		Poor	
		Droughty	0.10	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.26	Slope	0.08	Depth to bedrock	0.26
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50				
MwE:							
Mars Hill	55	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.23	Rock fragments	0.76
		Too sandy	0.99			Too sandy	0.99
Walnut	35	Fair		Poor		Poor	
		Droughty	0.09	Slope	0.00	Slope	0.00
		Depth to bedrock	0.26	Depth to bedrock	0.00	Depth to bedrock	0.26
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50				
MwF:							
Mars Hill	55	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.23	Rock fragments	0.76
		Too sandy	0.99			Too sandy	0.99
Walnut	35	Fair		Poor		Poor	
		Droughty	0.10	Slope	0.00	Slope	0.00
		Depth to bedrock	0.26	Depth to bedrock	0.00	Depth to bedrock	0.26
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50				
MyB:							
Maymead	65	Fair		Fair		Fair	
		Too acid	0.50	Cobble content	0.99	Rock fragments	0.02
		Organic matter content low	0.50			Hard to reclaim (rock fragments)	0.18
						Too acid	0.88
Northcove	25	Poor		Poor		Poor	
		Stone content	0.00	Stone content	0.00	Rock fragments	0.00
		Too acid	0.20	Cobble content	0.00	Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.50			Too acid	0.76
		Cobble content	0.56				

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
NhC:							
Northcove-----------	65	Poor		Poor		Poor	
		Stone content	0.00	Stone content	0.00	Rock fragments	0.00
		Too acid	0.20	Cobble content	0.00	Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.50			Slope	0.37
		Cobble content	0.56			Too acid	0.76
Maymead-------------	25	Fair		Fair		Fair	
		Too acid	0.50	Cobble content	0.99	Rock fragments	0.02
		Organic matter content low	0.50			Hard to reclaim (rock fragments)	0.18
						Slope	0.37
						Too acid	0.88
NtD:							
Northcove-----------	60	Poor		Poor		Poor	
		Stone content	0.00	Stone content	0.00	Slope	0.00
		Too acid	0.20	Cobble content	0.00	Rock fragments	0.00
		Organic matter content low	0.50	Slope	0.08	Hard to reclaim (rock fragments)	0.00
		Cobble content	0.56			Too acid	0.76
Maymead-------------	30	Fair		Fair		Poor	
		Too acid	0.50	Slope	0.08	Slope	0.00
		Organic matter content low	0.50	Cobble content	0.99	Rock fragments	0.02
						Hard to reclaim (rock fragments)	0.18
						Too acid	0.88
NtE:							
Northcove-----------	45	Poor		Poor		Poor	
		Stone content	0.00	Slope	0.00	Slope	0.00
		Too acid	0.20	Stone content	0.00	Rock fragments	0.00
		Organic matter content low	0.50	Cobble content	0.00	Hard to reclaim (rock fragments)	0.00
		Cobble content	0.56			Too acid	0.76
Maymead-------------	35	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Cobble content	0.99	Rock fragments	0.02
						Hard to reclaim (rock fragments)	0.18
						Too acid	0.88
OwC:							
Oconaluftee---------	45	Fair		Good		Poor	
		Too acid	0.08			Rock fragments	0.00
		Organic matter content low	0.50			Too acid	0.50
						Slope	0.63
						Hard to reclaim (rock fragments)	0.76
Guyot---------------	25	Fair		Fair		Fair	
		Organic matter content low	0.12	Depth to bedrock	0.87	Too acid	0.59
		Too acid	0.50			Slope	0.63
						Hard to reclaim (rock fragments)	0.95
						Rock fragments	0.96

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
OwC:							
Cataloochee	20	Fair Organic matter content low Too acid Depth to bedrock Droughty	 0.12 0.50 0.65 0.66	Poor Depth to bedrock	 0.00	Fair Rock fragments Slope Depth to bedrock Too acid	 0.18 0.63 0.65 0.76
OwD:							
Oconaluftee	45	Fair Too acid Organic matter content low	 0.08 0.50	Fair Slope	 0.08	Poor Slope Rock fragments Too acid Hard to reclaim (rock fragments)	 0.00 0.00 0.50 0.76
Guyot	25	Fair Organic matter content low Too acid	 0.12 0.50	Fair Slope Depth to bedrock	 0.08 0.87	Poor Slope Too acid Hard to reclaim (rock fragments) Rock fragments	 0.00 0.59 0.95 0.96
Cataloochee	20	Fair Organic matter content low Too acid Depth to bedrock Droughty	 0.12 0.50 0.65 0.66	Poor Depth to bedrock Slope	 0.00 0.08	Poor Slope Rock fragments Depth to bedrock Too acid	 0.00 0.18 0.65 0.76
OwE:							
Oconaluftee	35	Fair Too acid Organic matter content low	 0.08 0.50	Poor Slope	 0.00	Poor Slope Rock fragments Too acid Hard to reclaim (rock fragments)	 0.00 0.00 0.50 0.76
Guyot	30	Fair Organic matter content low Too acid	 0.12 0.50	Poor Slope Depth to bedrock	 0.00 0.87	Poor Slope Too acid Hard to reclaim (rock fragments) Rock fragments	 0.00 0.59 0.95 0.96
Cataloochee	25	Fair Organic matter content low Too acid Depth to bedrock Droughty	 0.12 0.50 0.65 0.66	Poor Slope Depth to bedrock	 0.00 0.00	Poor Slope Rock fragments Depth to bedrock Too acid	 0.00 0.18 0.65 0.76
OwF:							
Oconaluftee	40	Fair Too acid Organic matter content low	 0.08 0.50	Poor Slope	 0.00	Poor Slope Rock fragments Too acid Hard to reclaim (rock fragments)	 0.00 0.00 0.50 0.76

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
OwF:							
Guyot	35	Fair		Poor		Poor	
		Organic matter content low	0.12	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.87	Too acid	0.59
						Hard to reclaim (rock fragments)	0.95
						Rock fragments	0.96
Cataloochee	25	Fair		Poor		Poor	
		Organic matter content low	0.12	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.00	Rock fragments	0.18
		Depth to bedrock	0.65			Depth to bedrock	0.65
		Droughty	0.66			Too acid	0.76
PwC:							
Porters	40	Fair		Fair		Fair	
		Organic matter content low	0.50	Depth to bedrock	0.87	Rock fragments	0.01
		Too acid	0.68			Slope	0.37
						Hard to reclaim (rock fragments)	0.95
Unaka	40	Fair		Poor		Fair	
		Depth to bedrock	0.29	Depth to bedrock	0.00	Depth to bedrock	0.29
		Droughty	0.45			Slope	0.37
		Too acid	0.50			Rock fragments	0.41
		Organic matter content low	0.50			Too acid	0.88
PwD:							
Porters	60	Fair		Fair		Poor	
		Organic matter content low	0.50	Slope	0.08	Slope	0.00
		Too acid	0.68	Depth to bedrock	0.87	Rock fragments	0.01
						Hard to reclaim (rock fragments)	0.95
Unaka	30	Fair		Poor		Poor	
		Depth to bedrock	0.29	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.45	Slope	0.08	Depth to bedrock	0.29
		Too acid	0.50			Rock fragments	0.41
		Organic matter content low	0.50			Too acid	0.88
PwE:							
Porters	50	Fair		Poor		Poor	
		Organic matter content low	0.50	Slope	0.00	Slope	0.00
		Too acid	0.68	Depth to bedrock	0.87	Rock fragments	0.01
						Hard to reclaim (rock fragments)	0.95
Unaka	30	Fair		Poor		Poor	
		Depth to bedrock	0.29	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.45	Slope	0.00	Depth to bedrock	0.29
		Too acid	0.50			Rock fragments	0.41
		Organic matter content low	0.50			Too acid	0.88

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
PxF:							
Porters	40	Fair		Poor		Poor	
		Organic matter content low	0.50	Slope	0.00	Slope	0.00
		Too acid	0.68	Depth to bedrock	0.87	Rock fragments	0.01
						Hard to reclaim (rock fragments)	0.95
Unaka	35	Fair		Poor		Poor	
		Depth to bedrock	0.29	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.45	Slope	0.00	Depth to bedrock	0.29
		Too acid	0.50			Rock fragments	0.41
		Organic matter content low	0.50			Too acid	0.88
RbA:							
Reddies	80	Fair		Fair		Poor	
		Organic matter content low	0.12	Wetness depth	0.98	Hard to reclaim (rock fragments)	0.00
		Too acid	0.88			Rock fragments	0.82
		Droughty	0.97			Wetness depth	0.98
RcF:							
Rock outcrop	55	Not rated		Not rated		Not rated	
Cataska	30	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Rock fragments	0.00
		Too acid	0.50			Depth to bedrock	0.00
						Too acid	0.59
RhD:							
Rock outcrop	60	Not rated		Not rated		Not rated	
Chestoa	30	Fair		Poor		Poor	
		Droughty	0.07	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.21	Slope	0.68	Depth to bedrock	0.21
		Too acid	0.50			Too acid	0.50
RhF:							
Rock outcrop	65	Not rated		Not rated		Not rated	
Chestoa	25	Fair		Poor		Poor	
		Droughty	0.07	Slope	0.00	Slope	0.00
		Depth to bedrock	0.21	Depth to bedrock	0.00	Depth to bedrock	0.21
		Too acid	0.50			Too acid	0.50
RkF:							
Rock outcrop	60	Not rated		Not rated		Not rated	
Cleveland	30	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Depth to bedrock	0.00
		Organic matter content low	0.50			Rock fragments	0.68
		Too acid	0.54			Too acid	0.98

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
RoF:							
Rock outcrop	60	Not rated		Not rated		Not rated	
Oteen	30	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Depth to bedrock	0.00
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50			Too sandy	0.99
		Too sandy	0.99				
RpF:							
Rock outcrop	45	Not rated		Not rated		Not rated	
Unicoi	40	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Depth to bedrock	0.00
		Too acid	0.50			Rock fragments	0.00
		Organic matter content low	0.50			Too acid	0.59
RsA:							
Rosman	80	Fair		Good		Good	
		Organic matter content low	0.50				
		Too acid	0.84				
SoD:							
Soco	50	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.00
		Organic matter content low	0.50	Slope	0.08	Too acid	0.50
						Depth to bedrock	0.90
		Depth to bedrock	0.90				
		Droughty	0.91				
Stecoah	40	Fair		Fair		Poor	
		Too acid	0.50	Slope	0.08	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.16	Too acid	0.50
SoE:							
Soco	65	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.00	Too acid	0.50
						Depth to bedrock	0.90
		Depth to bedrock	0.90				
		Droughty	0.91				
Stecoah	25	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.58	Too acid	0.50
SoF:							
Soco	45	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.00	Too acid	0.50
						Depth to bedrock	0.90
		Depth to bedrock	0.90				
		Droughty	0.91				

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material Rating class and limiting features	Value	Potential source of roadfill Rating class and limiting features	Value	Potential source of topsoil Rating class and limiting features	Value
SoF:							
Stecoah-------------	35	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.16	Too acid	0.50
StB:							
Statler-------------	85	Fair		Poor		Fair	
		Organic matter content low	0.50	Low strength	0.00	Rock fragments	0.88
		Too acid	0.84				
SwD:							
Sylco---------------	60	Fair		Poor		Poor	
		Droughty	0.08	Depth to bedrock	0.00	Slope	0.00
		Stone content	0.13	Slope	0.08	Rock fragments	0.00
		Too acid	0.50	Cobble content	0.40	Depth to bedrock	0.54
		Depth to bedrock	0.54	Stone content	0.60	Too acid	0.59
		Cobble content	0.73				
		Organic matter content low	0.88				
Cataska-------------	30	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.08	Rock fragments	0.00
		Stone content	0.11	No stoniness limitation	0.99	Depth to bedrock	0.00
		Too acid	0.50			Too acid	0.59
		Organic matter content low	0.50				
		Cobble content	0.69				
SwE:							
Sylco---------------	45	Fair		Poor		Poor	
		Droughty	0.08	Slope	0.00	Slope	0.00
		Stone content	0.13	Depth to bedrock	0.00	Rock fragments	0.00
		Too acid	0.50	Cobble content	0.40	Depth to bedrock	0.54
		Depth to bedrock	0.54	Stone content	0.60	Too acid	0.59
		Cobble content	0.73				
		Organic matter content low	0.88				
Cataska-------------	35	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Rock fragments	0.00
		Stone content	0.11	No stoniness limitation	0.99	Depth to bedrock	0.00
		Too acid	0.50			Too acid	0.59
		Organic matter content low	0.50				
		Cobble content	0.69				
SyD:							
Sylco---------------	55	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Slope	0.08	Rock fragments	0.00
		Organic matter content low	0.50			Depth to bedrock	0.54
		Depth to bedrock	0.54			Too acid	0.59

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
SyD:							
Soco----------------	40	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.00
		Organic matter content low	0.50	Slope	0.08	Too acid	0.50
						Rock fragments	0.83
		Droughty	0.84			Depth to bedrock	0.90
		Depth to bedrock	0.90				
SyE:							
Sylco---------------	55	Poor		Poor		Poor	
		Droughty	0.00	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.00	Rock fragments	0.00
		Organic matter content low	0.50			Depth to bedrock	0.54
						Too acid	0.59
		Depth to bedrock	0.54				
Soco----------------	40	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.00	Too acid	0.50
						Rock fragments	0.83
		Droughty	0.84			Depth to bedrock	0.90
		Depth to bedrock	0.90				
SzF:							
Sylco---------------	50	Poor		Poor		Poor	
		Droughty	0.00	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.00	Rock fragments	0.00
		Organic matter content low	0.50			Depth to bedrock	0.54
						Too acid	0.59
		Depth to bedrock	0.54				
Soco----------------	35	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.00	Too acid	0.50
						Rock fragments	0.83
		Droughty	0.84			Depth to bedrock	0.90
		Depth to bedrock	0.90				
TaB:							
Tate----------------	85	Fair		Poor		Fair	
		Organic matter content low	0.50	Low strength	0.00	Hard to reclaim (rock fragments)	0.18
		Too acid	0.68			Rock fragments	0.99
TaC:							
Tate----------------	85	Fair		Poor		Fair	
		Organic matter content low	0.50	Low strength	0.00	Hard to reclaim (rock fragments)	0.18
		Too acid	0.68			Slope	0.37
						Rock fragments	0.99
TaD:							
Tate----------------	85	Fair		Poor		Poor	
		Organic matter content low	0.50	Low strength	0.00	Slope	0.00
				Slope	0.08	Hard to reclaim (rock fragments)	0.18
		Too acid	0.68				
						Rock fragments	0.99

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
TkC:							
Tate----------------	85	Fair		Good		Poor	
		Too acid	0.20			Rock fragments	0.00
		Organic matter content low	0.50			Hard to reclaim (rock fragments)	0.18
						Slope	0.37
						Too acid	0.76
TkD:							
Tate----------------	85	Fair		Fair		Poor	
		Too acid	0.20	Slope	0.08	Slope	0.00
		Organic matter content low	0.50			Rock fragments	0.00
						Hard to reclaim (rock fragments)	0.18
						Too acid	0.76
TmC:							
Tate----------------	50	Fair		Poor		Fair	
		Organic matter content low	0.50	Low strength	0.00	Slope	0.96
		Too acid	0.68			Rock fragments	0.99
Urban land----------	40	Not rated		Not rated		Not rated	
ToD:							
Toecane-------------	80	Poor		Poor		Poor	
		Cobble content	0.00	Cobble content	0.00	Slope	0.00
		Stone content	0.04	Slope	0.08	Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.12	Stone content	0.16	Rock fragments	0.00
		Too acid	0.50			Too acid	0.76
ToE:							
Toecane-------------	85	Poor		Poor		Poor	
		Cobble content	0.00	Slope	0.00	Slope	0.00
		Stone content	0.04	Cobble content	0.00	Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.12	Stone content	0.16	Rock fragments	0.00
		Too acid	0.50			Too acid	0.76
TrC:							
Toecane-------------	50	Poor		Poor		Poor	
		Cobble content	0.00	Cobble content	0.00	Hard to reclaim (rock fragments)	0.00
		Stone content	0.09	Stone content	0.36	Rock fragments	0.00
		Organic matter content low	0.12			Slope	0.37
		Too acid	0.50			Too acid	0.76
Tusquitee-----------	40	Fair		Good		Fair	
		Organic matter content low	0.50			Slope	0.37
		Too acid	0.54			Hard to reclaim (rock fragments)	0.74
						Rock fragments	0.82
						Too acid	0.98

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
TsD:							
Toecane	50	Poor		Poor		Poor	
		Cobble content	0.00	Cobble content	0.00	Slope	0.00
		Stone content	0.09	Slope	0.08	Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.12	Stone content	0.36	Rock fragments	0.00
		Too acid	0.50			Too acid	0.76
Tusquitee	40	Fair		Fair		Poor	
		Organic matter content low	0.50	Slope	0.08	Slope	0.00
		Too acid	0.54			Hard to reclaim (rock fragments)	0.74
						Rock fragments	0.82
						Too acid	0.98
TsE:							
Toecane	55	Poor		Poor		Poor	
		Cobble content	0.00	Slope	0.00	Slope	0.00
		Stone content	0.09	Cobble content	0.00	Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.12	Stone content	0.36	Rock fragments	0.00
		Too acid	0.50			Too acid	0.76
Tusquitee	35	Fair		Poor		Poor	
		Organic matter content low	0.50	Slope	0.00	Slope	0.00
		Too acid	0.54			Hard to reclaim (rock fragments)	0.74
						Rock fragments	0.82
						Too acid	0.98
TuD:							
Tusquitee	65	Fair		Fair		Poor	
		Organic matter content low	0.50	Slope	0.08	Slope	0.00
		Too acid	0.54			Hard to reclaim (rock fragments)	0.74
						Rock fragments	0.82
						Too acid	0.98
Toecane	25	Poor		Poor		Poor	
		Cobble content	0.00	Cobble content	0.00	Slope	0.00
		Stone content	0.09	Slope	0.08	Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.12	Stone content	0.36	Rock fragments	0.00
		Too acid	0.50			Too acid	0.76
TwB:							
Tusquitee	55	Fair		Good		Fair	
		Organic matter content low	0.50			Hard to reclaim (rock fragments)	0.74
		Too acid	0.54			Rock fragments	0.82
						Too acid	0.98
Whiteside	35	Fair		Fair		Fair	
		Organic matter content low	0.12	Wetness depth	0.89	Rock fragments	0.82
		Too acid	0.54			Wetness depth	0.89
						Too acid	0.98

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
TwC:							
Tusquitee	55	Fair		Good		Fair	
		Organic matter content low	0.50			Slope	0.37
		Too acid	0.54			Hard to reclaim (rock fragments)	0.74
						Rock fragments	0.82
						Too acid	0.98
Whiteside	35	Fair		Fair		Fair	
		Organic matter content low	0.12	Wetness depth	0.89	Slope	0.37
						Rock fragments	0.82
		Too acid	0.54			Wetness depth	0.89
						Too acid	0.98
UcB:							
Udifluvents	95	Poor		Good		Poor	
		Too sandy	0.00			Too sandy	0.00
		Organic matter content low	0.12			Rock fragments	0.99
Ud:							
Udorthents	85	Fair		Good		Good	
		Organic matter content low	0.12				
		Too acid	0.97				
UfB:							
Udorthents	60	Fair		Good		Good	
		Organic matter content low	0.12				
		Too acid	0.97				
Urban land	30	Not rated		Not rated		Not rated	
UhE:							
Udorthents	55	Fair		Poor		Poor	
		Organic matter content low	0.12	Slope	0.00	Slope	0.00
				Low strength	0.00		
		Too acid	0.97				
Urban land	35	Not rated		Not rated		Not rated	
UkE:							
Unaka	40	Fair		Poor		Poor	
		Depth to bedrock	0.29	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.45	Slope	0.00	Depth to bedrock	0.29
		Too acid	0.50			Rock fragments	0.41
		Organic matter content low	0.50			Too acid	0.88
Rock outcrop	35	Not rated		Not rated		Not rated	
UkF:							
Unaka	40	Fair		Poor		Poor	
		Depth to bedrock	0.29	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.45	Slope	0.00	Depth to bedrock	0.29
		Too acid	0.50			Rock fragments	0.41
		Organic matter content low	0.50			Too acid	0.88
Rock outcrop	35	Not rated		Not rated		Not rated	

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
UrD:							
Unicoi--------------	60	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00	Slope	0.68	Rock fragments	0.00
		Too acid	0.50			Slope	0.00
		Organic matter content low	0.50			Too acid	0.59
Rock outcrop--------	30	Not rated		Not rated		Not rated	
UsB:							
Unison--------------	90	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Organic matter content low	0.50	Shrink-swell	0.95	Hard to reclaim (rock fragments)	0.00
		Too acid	0.54			Too acid	0.98
						Rock fragments	0.99
UsC:							
Unison--------------	80	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Organic matter content low	0.50	Shrink-swell	0.95	Hard to reclaim (rock fragments)	0.00
		Too acid	0.54			Slope	0.37
						Too acid	0.98
						Rock fragments	0.99
UsD:							
Unison--------------	80	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Slope	0.00
		Organic matter content low	0.50	Slope	0.08	Too clayey	0.00
		Too acid	0.54	Shrink-swell	0.95	Hard to reclaim (rock fragments)	0.00
						Too acid	0.98
						Rock fragments	0.99
W:							
Water---------------	100	Not rated		Not rated		Not rated	
WaC2:							
Walnut--------------	40	Fair		Poor		Fair	
		Droughty	0.03	Depth to bedrock	0.00	Depth to bedrock	0.26
		Depth to bedrock	0.26			Slope	0.37
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50				
Oteen---------------	35	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00			Slope	0.37
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50			Too sandy	0.99
		Too sandy	0.99				
Mars Hill-----------	20	Fair		Fair		Fair	
		Too acid	0.50	Depth to bedrock	0.23	Slope	0.37
		Organic matter content low	0.50			Rock fragments	0.76
		Too sandy	0.99			Too sandy	0.99

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
WaD2:							
Walnut	40	Fair		Poor		Poor	
		Droughty	0.03	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.26	Slope	0.08	Depth to bedrock	0.26
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50				
Oteen	35	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.08	Depth to bedrock	0.00
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50			Too sandy	0.99
		Too sandy	0.99				
Mars Hill	20	Fair		Fair		Poor	
		Too acid	0.50	Slope	0.08	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.23	Rock fragments	0.76
		Too sandy	0.99			Too sandy	0.99
WaE2:							
Walnut	40	Fair		Poor		Poor	
		Droughty	0.03	Slope	0.00	Slope	0.00
		Depth to bedrock	0.26	Depth to bedrock	0.00	Depth to bedrock	0.26
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50				
Oteen	35	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Depth to bedrock	0.00
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50			Too sandy	0.99
		Too sandy	0.99				
Mars Hill	20	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.23	Rock fragments	0.76
		Too sandy	0.99			Too sandy	0.99
WoF:							
Walnut	45	Fair		Poor		Poor	
		Droughty	0.09	Slope	0.00	Slope	0.00
		Depth to bedrock	0.26	Depth to bedrock	0.00	Depth to bedrock	0.26
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50				
Oteen	35	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Depth to bedrock	0.00
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50			Too sandy	0.99
		Too sandy	0.99				
Rock outcrop	20	Not rated		Not rated		Not rated	

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
WrC:							
Wayah	50	Fair		Good		Fair	
		Too acid	0.08			Hard to reclaim (rock fragments)	0.26
		Organic matter content low	0.50			Slope	0.37
						Rock fragments	0.82
						Too acid	0.98
Burton	40	Fair		Poor		Fair	
		Depth to bedrock	0.16	Depth to bedrock	0.00	Depth to bedrock	0.16
		Droughty	0.27			Slope	0.37
		Too acid	0.50			Rock fragments	0.50
						Too acid	0.76
WrD:							
Wayah	50	Fair		Fair		Poor	
		Too acid	0.08	Slope	0.08	Slope	0.00
		Organic matter content low	0.50			Hard to reclaim (rock fragments)	0.26
						Rock fragments	0.82
						Too acid	0.98
Burton	40	Fair		Poor		Poor	
		Depth to bedrock	0.16	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.27	Slope	0.08	Depth to bedrock	0.16
		Too acid	0.50			Rock fragments	0.50
						Too acid	0.76
WrE:							
Wayah	50	Fair		Poor		Poor	
		Too acid	0.08	Slope	0.00	Slope	0.00
		Organic matter content low	0.50			Hard to reclaim (rock fragments)	0.26
						Rock fragments	0.82
						Too acid	0.98
Burton	40	Fair		Poor		Poor	
		Depth to bedrock	0.16	Slope	0.00	Slope	0.00
		Droughty	0.27	Depth to bedrock	0.00	Depth to bedrock	0.16
		Too acid	0.50			Rock fragments	0.50
						Too acid	0.76
WsF:							
Wayah	60	Fair		Poor		Poor	
		Too acid	0.08	Slope	0.00	Slope	0.00
		Organic matter content low	0.50			Hard to reclaim (rock fragments)	0.26
						Rock fragments	0.82
						Too acid	0.98
Burton	30	Fair		Poor		Poor	
		Depth to bedrock	0.16	Slope	0.00	Slope	0.00
		Droughty	0.27	Depth to bedrock	0.00	Depth to bedrock	0.16
		Too acid	0.50			Rock fragments	0.50
						Too acid	0.76
WtB:							
Whiteside	90	Fair		Fair		Fair	
		Organic matter content low	0.50	Wetness depth	0.89	Rock fragments	0.82
						Wetness depth	0.89
		Too acid	0.54			Too acid	0.98

Table 16.—Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pond reservoir areas		Embankments, dikes and levees	
	Rating class and limiting features	Value	Rating class and limiting features	Value
AcD:				
Ashe	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.86
	Slope	0.96	Seepage	0.03
	Depth to bedrock	0.86		
Cleveland	Very limited		Very limited	
	Depth to bedrock	1.00	Thin layer	1.00
	Slope	0.96	Seepage	0.04
Rock outcrop	Not rated		Not rated	
ArE:				
Ashe	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.86
	Slope	1.00	Seepage	0.03
	Depth to bedrock	0.86		
Cleveland	Very limited		Very limited	
	Slope	1.00	Thin layer	1.00
	Depth to bedrock	1.00	Seepage	0.04
Rock outcrop	Not rated		Not rated	
ArF:				
Ashe	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.86
	Slope	1.00	Seepage	0.03
	Depth to bedrock	0.86		
Cleveland	Very limited		Very limited	
	Slope	1.00	Thin layer	1.00
	Depth to bedrock	1.00	Seepage	0.04
Rock outcrop	Not rated		Not rated	
BaA:				
Biltmore	Very limited		Somewhat limited	
	Seepage	1.00	Seepage	0.86
BkB2:				
Braddock	Very limited		Not limited	
	Seepage	1.00		
BkC2:				
Braddock	Very limited		Not limited	
	Seepage	1.00		
	Slope	0.04		
BkD2:				
Braddock	Very limited		Not limited	
	Seepage	1.00		
	Slope	0.96		

Table 16.—Water Management—Continued

Map symbol and soil name	Pond reservoir areas		Embankments, dikes and levees	
	Rating class and limiting features	Value	Rating class and limiting features	Value
BnD:				
Buladean	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.11
	Slope	0.96	Seepage	0.06
	Depth to bedrock	0.01		
Chestnut	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Slope	0.96	Thin layer	0.94
	Depth to bedrock	0.20		
BnE:				
Buladean	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.11
	Slope	1.00	Seepage	0.06
	Depth to bedrock	0.01		
Chestnut	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Slope	1.00	Thin layer	0.94
	Depth to bedrock	0.20		
BnF:				
Buladean	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.11
	Slope	1.00	Seepage	0.06
	Depth to bedrock	0.01		
Chestnut	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Slope	1.00	Thin layer	0.94
	Depth to bedrock	0.20		
CaD:				
Calvin	Very limited		Somewhat limited	
	Seepage	1.00	Large stones content	0.71
	Slope	0.96		
	Depth to bedrock	0.04	Thin layer	0.70
			Seepage	0.25
CaE:				
Calvin	Very limited		Somewhat limited	
	Seepage	1.00	Large stones content	0.71
	Slope	1.00		
	Depth to bedrock	0.04	Thin layer	0.70
			Seepage	0.25
CaF:				
Calvin	Very limited		Somewhat limited	
	Seepage	1.00	Large stones content	0.71
	Slope	1.00		
	Depth to bedrock	0.04	Thin layer	0.70
			Seepage	0.25
CfF:				
Cataska	Very limited		Very limited	
	Slope	1.00	Thin layer	1.00
	Depth to bedrock	0.91	Seepage	0.44
	Seepage	0.43		

Table 16.—Water Management—Continued

Map symbol and soil name	Pond reservoir areas		Embankments, dikes and levees	
	Rating class and limiting features	Value	Rating class and limiting features	Value
CfF:				
Sylco	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Slope	1.00	Thin layer	0.86
	Depth to bedrock	0.86		
Rock outcrop	Not rated		Not rated	
ChD:				
Cheoah	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Slope	0.96	Thin layer	0.08
	Depth to bedrock	0.01		
Jeffrey	Very limited		Very limited	
	Seepage	1.00	Piping	0.99
	Slope	0.96	Thin layer	0.83
	Depth to bedrock	0.83		
ChE:				
Cheoah	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Slope	1.00	Thin layer	0.08
	Depth to bedrock	0.01		
Jeffrey	Very limited		Very limited	
	Seepage	1.00	Piping	0.99
	Slope	1.00	Thin layer	0.83
	Depth to bedrock	0.83		
ChF:				
Cheoah	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Slope	1.00	Thin layer	0.08
	Depth to bedrock	0.01		
Jeffrey	Very limited		Very limited	
	Seepage	1.00	Piping	0.99
	Slope	1.00	Thin layer	0.83
	Depth to bedrock	0.83		
CsD:				
Chestoa	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.95
	Slope	0.96	Seepage	0.04
	Depth to bedrock	0.95		
CsE:				
Chestoa	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.95
	Slope	1.00	Seepage	0.04
	Depth to bedrock	0.95		
CsF:				
Chestoa	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.95
	Slope	1.00	Seepage	0.04
	Depth to bedrock	0.95		

Table 16.—Water Management—Continued

Map symbol and soil name	Pond reservoir areas		Embankments, dikes and levees	
	Rating class and limiting features	Value	Rating class and limiting features	Value
CtB2:				
Clifton	Very limited		Not limited	
	Seepage	1.00		
CtC2:				
Clifton	Very limited		Not limited	
	Seepage	1.00		
	Slope	0.04		
CtD2:				
Clifton	Very limited		Not limited	
	Seepage	1.00		
	Slope	0.96		
CtE2:				
Clifton	Very limited		Not limited	
	Seepage	1.00		
	Slope	1.00		
CxC:				
Clifton	Very limited		Not limited	
	Seepage	1.00		
	Slope	0.04		
Urban land	Not rated		Not rated	
DeA:				
Dellwood	Very limited		Somewhat limited	
	Seepage	1.00	Seepage	0.68
			Depth to saturated zone	0.43
			Large stones content	0.02
Reddies	Very limited		Somewhat limited	
	Seepage	1.00	Seepage	0.79
			Depth to saturated zone	0.68
DrB:				
Dillard	Very limited		Somewhat limited	
	Seepage	1.00	Depth to saturated zone	0.86
			Piping	0.79
			Seepage	0.04
DtD:				
Ditney	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Slope	0.96	Thin layer	0.86
	Depth to bedrock	0.86	Seepage	0.02
Unicoi	Very limited		Very limited	
	Depth to bedrock	1.00	Thin layer	1.00
	Slope	0.96	Large stones content	0.10
			Seepage	0.04

Table 16.—Water Management—Continued

Map symbol and soil name	Pond reservoir areas		Embankments, dikes and levees	
	Rating class and limiting features	Value	Rating class and limiting features	Value
DuE:				
Ditney	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.86
	Slope	1.00	Seepage	0.02
	Depth to bedrock	0.86		
Unicoi	Very limited		Very limited	
	Slope	1.00	Thin layer	1.00
	Depth to bedrock	1.00	Large stones content	0.10
			Seepage	0.04
DuF:				
Ditney	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.86
	Slope	1.00	Seepage	0.02
	Depth to bedrock	0.86		
Unicoi	Very limited		Very limited	
	Slope	1.00	Thin layer	1.00
	Depth to bedrock	1.00	Seepage	0.04
			Large stones content	0.01
EdD:				
Edneyville	Very limited		Somewhat limited	
	Seepage	1.00	Seepage	0.04
	Slope	0.96		
Chestnut	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.66
	Slope	0.96	Seepage	0.01
	Depth to bedrock	0.03		
EdE:				
Edneyville	Very limited		Somewhat limited	
	Seepage	1.00	Seepage	0.04
	Slope	1.00		
Chestnut	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.66
	Slope	1.00	Seepage	0.01
	Depth to bedrock	0.03		
EdF:				
Edneyville	Very limited		Somewhat limited	
	Seepage	1.00	Seepage	0.04
	Slope	1.00		
Chestnut	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.66
	Slope	1.00	Seepage	0.01
	Depth to bedrock	0.03		
EfA:				
Ela, drained	Very limited		Very limited	
	Seepage	1.00	Ponding	1.00
			Depth to saturated zone	1.00
			Seepage	0.03

Table 16.—Water Management—Continued

Map symbol and soil name	Pond reservoir areas		Embankments, dikes and levees	
	Rating class and limiting features	Value	Rating class and limiting features	Value
EfA:				
Ela, undrained	Very limited		Very limited	
	Seepage	1.00	Ponding	1.00
			Depth to saturated zone	1.00
			Seepage	0.20
EvD2:				
Evard	Somewhat limited		Somewhat limited	
	Slope	0.96	Seepage	0.04
	Seepage	0.70		
Cowee	Somewhat limited		Somewhat limited	
	Slope	0.96	Thin layer	0.94
	Seepage	0.70		
	Depth to bedrock	0.20		
EvE2:				
Evard	Very limited		Somewhat limited	
	Slope	1.00	Seepage	0.04
	Seepage	0.70		
Cowee	Very limited		Somewhat limited	
	Slope	1.00	Thin layer	0.94
	Seepage	0.70		
	Depth to bedrock	0.20		
EvF2:				
Evard	Very limited		Somewhat limited	
	Slope	1.00	Seepage	0.04
	Seepage	0.70		
Cowee	Very limited		Somewhat limited	
	Slope	1.00	Thin layer	0.94
	Seepage	0.70		
	Depth to bedrock	0.20		
EwD:				
Evard	Somewhat limited		Somewhat limited	
	Slope	0.96	Seepage	0.04
	Seepage	0.70		
Cowee	Somewhat limited		Somewhat limited	
	Slope	0.96	Thin layer	0.56
	Seepage	0.70		
	Depth to bedrock	0.02		
EwE:				
Evard	Very limited		Somewhat limited	
	Slope	1.00	Seepage	0.04
	Seepage	0.70		
Cowee	Very limited		Somewhat limited	
	Slope	1.00	Thin layer	0.56
	Seepage	0.70		
	Depth to bedrock	0.02		
EwF:				
Evard	Very limited		Somewhat limited	
	Slope	1.00	Seepage	0.04
	Seepage	0.70		

Table 16.—Water Management—Continued

Map symbol and soil name	Pond reservoir areas		Embankments, dikes and levees	
	Rating class and limiting features	Value	Rating class and limiting features	Value
EwF:				
Cowee	Very limited		Somewhat limited	
	Slope	1.00	Thin layer	0.56
	Seepage	0.70		
	Depth to bedrock	0.02		
FnD2:				
Fannin	Somewhat limited		Somewhat limited	
	Slope	0.96	Seepage	0.01
	Seepage	0.70		
FrA:				
French	Very limited		Very limited	
	Seepage	1.00	Depth to saturated zone	1.00
			Seepage	0.79
HcE:				
Heintooga	Very limited		Very limited	
	Seepage	1.00	Large stones content	1.00
	Slope	1.00	Seepage	0.40
Chiltoskie	Very limited		Somewhat limited	
	Seepage	1.00	Seepage	0.04
	Slope	1.00		
HpA:				
Hemphill, drained	Somewhat limited		Very limited	
	Seepage	0.70	Depth to saturated zone	1.00
Hemphill, undrained	Somewhat limited		Very limited	
	Seepage	0.70	Ponding	1.00
			Depth to saturated zone	1.00
JbD:				
Junaluska	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.66
	Slope	0.96		
	Depth to bedrock	0.03		
Brasstown	Somewhat limited		Somewhat limited	
	Slope	0.96	Piping	0.55
	Seepage	0.70	Thin layer	0.26
	Depth to bedrock	0.01		
JbE:				
Junaluska	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.66
	Slope	1.00		
	Depth to bedrock	0.03		
Brasstown	Very limited		Somewhat limited	
	Slope	1.00	Piping	0.55
	Seepage	0.70	Thin layer	0.26
	Depth to bedrock	0.01		
JbF:				
Junaluska	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.66
	Slope	1.00		
	Depth to bedrock	0.03		

Table 16.—Water Management—Continued

Map symbol and soil name	Pond reservoir areas		Embankments, dikes and levees	
	Rating class and limiting features	Value	Rating class and limiting features	Value
JbF:				
Brasstown-----------	Very limited		Somewhat limited	
	Slope	1.00	Piping	0.55
	Seepage	0.70	Thin layer	0.26
	Depth to bedrock	0.01		
KnC:				
Keener--------------	Very limited		Not limited	
	Seepage	1.00		
	Slope	0.04		
MwC:				
Mars Hill-----------	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.22
	Slope	0.04	Seepage	0.02
	Depth to bedrock	0.01		
Walnut--------------	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.94
	Depth to bedrock	0.20	Seepage	0.02
	Slope	0.04		
MwD:				
Mars Hill-----------	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.22
	Slope	0.96	Seepage	0.02
	Depth to bedrock	0.01		
Walnut--------------	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.94
	Slope	0.96	Seepage	0.02
	Depth to bedrock	0.20		
MwE:				
Mars Hill-----------	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.22
	Slope	1.00	Seepage	0.02
	Depth to bedrock	0.01		
Walnut--------------	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.94
	Slope	1.00	Seepage	0.02
	Depth to bedrock	0.20		
MwF:				
Mars Hill-----------	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.22
	Slope	1.00	Seepage	0.02
	Depth to bedrock	0.01		
Walnut--------------	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.94
	Slope	1.00	Seepage	0.02
	Depth to bedrock	0.20		
MyB:				
Maymead-------------	Very limited		Not limited	
	Seepage	1.00		
Northcove-----------	Very limited		Very limited	
	Seepage	1.00	Large stones content	1.00
			Seepage	0.03

Table 16.—Water Management—Continued

Map symbol and soil name	Pond reservoir areas		Embankments, dikes and levees	
	Rating class and limiting features	Value	Rating class and limiting features	Value
NhC:				
Northcove	Very limited		Very limited	
	Seepage	1.00	Large stones content	1.00
	Slope	0.04	Seepage	0.03
Maymead	Very limited		Not limited	
	Seepage	1.00		
	Slope	0.04		
NtD:				
Northcove	Very limited		Very limited	
	Seepage	1.00	Large stones content	1.00
	Slope	0.96	Seepage	0.03
Maymead	Very limited		Not limited	
	Seepage	1.00		
	Slope	0.96		
NtE:				
Northcove	Very limited		Very limited	
	Seepage	1.00	Large stones content	1.00
	Slope	1.00		
		1.00	Seepage	0.03
Maymead	Very limited		Not limited	
	Seepage	1.00		
	Slope	1.00		
OwC:				
Oconaluftee	Very limited		Not limited	
	Seepage	1.00		
	Slope	0.01		
Guyot	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.03
	Slope	0.01	Seepage	0.01
	Depth to bedrock	0.01		
Cataloochee	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.83
	Depth to bedrock	0.09	Seepage	0.01
	Slope	0.01		
OwD:				
Oconaluftee	Very limited		Not limited	
	Seepage	1.00		
	Slope	0.96		
Guyot	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.03
	Slope	0.96	Seepage	0.01
	Depth to bedrock	0.01		
Cataloochee	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.83
	Slope	0.96	Seepage	0.01
	Depth to bedrock	0.09		
OwE:				
Oconaluftee	Very limited		Not limited	
	Seepage	1.00		
	Slope	1.00		

Table 16.—Water Management—Continued

Map symbol and soil name	Pond reservoir areas		Embankments, dikes and levees	
	Rating class and limiting features	Value	Rating class and limiting features	Value
OwE:				
Guyot	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.03
	Slope	1.00	Seepage	0.01
	Depth to bedrock	0.01		
Cataloochee	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.83
	Slope	1.00	Seepage	0.01
	Depth to bedrock	0.09		
OwF:				
Oconaluftee	Very limited		Not limited	
	Seepage	1.00		
	Slope	1.00		
Guyot	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.03
	Slope	1.00	Seepage	0.01
	Depth to bedrock	0.01		
Cataloochee	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.83
	Slope	1.00	Seepage	0.01
	Depth to bedrock	0.09		
PwC:				
Porters	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.03
	Slope	0.04		
	Depth to bedrock	0.03		
Unaka	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Depth to bedrock	0.83	Thin layer	0.93
	Slope	0.04		
PwD:				
Porters	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.03
	Slope	0.96		
	Depth to bedrock	0.03		
Unaka	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Slope	0.96	Thin layer	0.93
	Depth to bedrock	0.83		
PwE:				
Porters	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.03
	Slope	1.00		
	Depth to bedrock	0.03		
Unaka	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Slope	1.00	Thin layer	0.93
	Depth to bedrock	0.83		

Table 16.—Water Management—Continued

Map symbol and soil name	Pond reservoir areas		Embankments, dikes and levees	
	Rating class and limiting features	Value	Rating class and limiting features	Value
PxF:				
Porters	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.03
	Slope	1.00		
	Depth to bedrock	0.03		
Unaka	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Slope	1.00	Thin layer	0.93
	Depth to bedrock	0.83		
RbA:				
Reddies	Very limited		Somewhat limited	
	Seepage	1.00	Seepage	0.79
			Depth to saturated zone	0.68
RcF:				
Rock outcrop	Not rated		Not rated	
Cataska	Very limited		Very limited	
	Slope	1.00	Thin layer	1.00
	Depth to bedrock	0.91	Seepage	0.44
	Seepage	0.43		
RhD:				
Rock outcrop	Not rated		Not rated	
Chestoa	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.95
	Depth to bedrock	0.95	Seepage	0.04
	Slope	0.68		
RhF:				
Rock outcrop	Not rated		Not rated	
Chestoa	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.95
	Slope	1.00	Seepage	0.04
	Depth to bedrock	0.95		
RkF:				
Rock outcrop	Not rated		Not rated	
Cleveland	Very limited		Very limited	
	Slope	1.00	Thin layer	1.00
	Depth to bedrock	1.00	Seepage	0.04
RoF:				
Rock outcrop	Not rated		Not rated	
Oteen	Very limited		Very limited	
	Slope	1.00	Thin layer	1.00
	Depth to bedrock	0.66	Seepage	0.04
	Seepage	0.43		

Table 16.—Water Management—Continued

Map symbol and soil name	Pond reservoir areas		Embankments, dikes and levees	
	Rating class and limiting features	Value	Rating class and limiting features	Value
RpF:				
Rock outcrop	Not rated		Not rated	
Unicoi	Very limited		Very limited	
	Slope	1.00	Thin layer	1.00
	Depth to bedrock	1.00	Seepage	0.04
			Large stones content	0.01
RsA:				
Rosman	Very limited		Not limited	
	Seepage	1.00		
SoD:				
Soco	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Slope	0.96	Thin layer	0.70
	Depth to bedrock	0.04		
Stecoah	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Slope	0.96	Thin layer	0.26
	Depth to bedrock	0.01		
SoE:				
Soco	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Slope	1.00	Thin layer	0.70
	Depth to bedrock	0.04		
Stecoah	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Slope	1.00	Thin layer	0.11
	Depth to bedrock	0.01		
SoF:				
Soco	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Slope	1.00	Thin layer	0.70
	Depth to bedrock	0.04		
Stecoah	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Slope	1.00	Thin layer	0.26
	Depth to bedrock	0.01		
StB:				
Statler	Somewhat limited		Somewhat limited	
	Seepage	0.70	Piping	0.05
SwD:				
Sylco	Very limited		Somewhat limited	
	Seepage	1.00	Large stones content	0.97
	Slope	0.96		
	Depth to bedrock	0.86	Thin layer	0.86
Cataska	Somewhat limited		Very limited	
	Slope	0.96	Thin layer	1.00
	Depth to bedrock	0.91	Large stones content	0.98
	Seepage	0.43		

Table 16.—Water Management—Continued

Map symbol and soil name	Pond reservoir areas		Embankments, dikes and levees	
	Rating class and limiting features	Value	Rating class and limiting features	Value
SwE:				
Sylco	Very limited		Somewhat limited	
	Seepage	1.00	Large stones content	0.97
	Slope	1.00	Thin layer	0.86
	Depth to bedrock	0.86		
Cataska	Very limited		Very limited	
	Slope	1.00	Thin layer	1.00
	Depth to bedrock	0.91	Large stones content	0.98
	Seepage	0.43		
SyD:				
Sylco	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.86
	Slope	0.96		
	Depth to bedrock	0.86		
Soco	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Slope	0.96	Thin layer	0.70
	Depth to bedrock	0.04		
SyE:				
Sylco	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.86
	Slope	1.00		
	Depth to bedrock	0.86		
Soco	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Slope	1.00	Thin layer	0.70
	Depth to bedrock	0.04		
SzF:				
Sylco	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.86
	Slope	1.00		
	Depth to bedrock	0.86		
Soco	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Slope	1.00	Thin layer	0.70
	Depth to bedrock	0.04		
TaB:				
Tate	Very limited		Somewhat limited	
	Seepage	1.00	Piping	0.55
TaC:				
Tate	Very limited		Somewhat limited	
	Seepage	1.00	Piping	0.55
	Slope	0.04		
TaD:				
Tate	Very limited		Somewhat limited	
	Seepage	1.00	Piping	0.55
	Slope	0.96		

Table 16.—Water Management—Continued

Map symbol and soil name	Pond reservoir areas		Embankments, dikes and levees	
	Rating class and limiting features	Value	Rating class and limiting features	Value
TkC:				
Tate	Very limited		Not limited	
	Seepage	1.00		
	Slope	0.04		
TkD:				
Tate	Very limited		Not limited	
	Seepage	1.00		
	Slope	0.96		
TmC:				
Tate	Very limited		Somewhat limited	
	Seepage	1.00	Piping	0.63
			Seepage	0.01
Urban land	Not rated		Not rated	
ToD:				
Toecane	Very limited		Very limited	
	Seepage	1.00	Large stones content	1.00
	Slope	0.96	Seepage	0.11
ToE:				
Toecane	Very limited		Very limited	
	Seepage	1.00	Large stones content	1.00
	Slope	1.00	Seepage	0.11
TrC:				
Toecane	Very limited		Very limited	
	Seepage	1.00	Large stones content	1.00
	Slope	0.04	Seepage	0.11
Tusquitee	Very limited		Somewhat limited	
	Seepage	1.00	Seepage	0.02
	Slope	0.04		
TsD:				
Toecane	Very limited		Very limited	
	Seepage	1.09	Large stones content	1.00
	Slope	0.96	Seepage	0.11
Tusquitee	Very limited		Somewhat limited	
	Seepage	1.00	Seepage	0.02
	Slope	0.96		
TsE:				
Toecane	Very limited		Very limited	
	Seepage	1.00	Large stones content	1.00
	Slope	1.00	Seepage	0.11
Tusquitee	Very limited		Somewhat limited	
	Seepage	1.00	Seepage	0.02
	Slope	1.00		

Table 16.—Water Management—Continued

Map symbol and soil name	Pond reservoir areas		Embankments, dikes and levees	
	Rating class and limiting features	Value	Rating class and limiting features	Value
TuD:				
Tusquitee-----------	Very limited		Somewhat limited	
	Seepage	1.00	Seepage	0.02
	Slope	0.96		
Toecane-------------	Very limited		Very limited	
	Seepage	1.00	Large stones content	1.00
	Slope	0.96	Seepage	0.11
TwB:				
Tusquitee-----------	Very limited		Somewhat limited	
	Seepage	1.00	Seepage	0.02
Whiteside-----------	Very limited		Somewhat limited	
	Seepage	1.00	Depth to saturated zone	0.86
			Seepage	0.01
TwC:				
Tusquitee-----------	Very limited		Somewhat limited	
	Seepage	1.00	Seepage	0.02
	Slope	0.04		
Whiteside-----------	Very limited		Somewhat limited	
	Seepage	1.00	Depth to saturated zone	0.86
	Slope	0.04	Seepage	0.01
UcB:				
Udifluvents---------	Very limited		Somewhat limited	
	Seepage	1.00	Seepage	0.86
Ud:				
Udorthents----------	Very limited		Not limited	
	Seepage	1.00		
UfB:				
Udorthents----------	Very limited		Somewhat limited	
	Seepage	1.00	Seepage	0.03
Urban land----------	Not rated		Not rated	
UhE:				
Udorthents----------	Very limited		Somewhat limited	
	Seepage	1.00	Seepage	0.03
	Slope	1.00		
Urban land----------	Not rated		Not rated	
UkE:				
Unaka---------------	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Slope	1.00	Thin layer	0.93
	Depth to bedrock	0.83		
Rock outcrop--------	Not rated		Not rated	

Table 16.—Water Management—Continued

Map symbol and soil name	Pond reservoir areas		Embankments, dikes and levees	
	Rating class and limiting features	Value	Rating class and limiting features	Value
UkF:				
Unaka	Very limited		Very limited	
	Seepage	1.00	Piping	1.00
	Slope	1.00	Thin layer	0.93
	Depth to bedrock	0.83		
Rock outcrop	Not rated		Not rated	
UrD:				
Unicoi	Very limited		Very limited	
	Depth to bedrock	1.00	Thin layer	1.00
	Slope	0.68	Seepage	0.04
			Large stones content	0.01
Rock outcrop	Not rated		Not rated	
UsB:				
Unison	Very limited		Not limited	
	Seepage	1.00		
UsC:				
Unison	Very limited		Not limited	
	Seepage	1.00		
	Slope	0.04		
UsD:				
Unison	Very limited		Not limited	
	Seepage	1.00		
	Slope	0.96		
W:				
Water	Not rated		Not rated	
WaC2:				
Walnut	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.94
	Depth to bedrock	0.20	Seepage	0.02
	Slope	0.04		
Oteen	Somewhat limited		Very limited	
	Depth to bedrock	0.66	Thin layer	1.00
	Seepage	0.43	Seepage	0.04
	Slope	0.04		
Mars Hill	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.22
	Slope	0.04	Seepage	0.02
	Depth to bedrock	0.01		
WaD2:				
Walnut	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.94
	Slope	0.96	Seepage	0.02
	Depth to bedrock	0.20		
Oteen	Somewhat limited		Very limited	
	Slope	0.96	Thin layer	1.00
	Depth to bedrock	0.66	Seepage	0.04
	Seepage	0.43		

Table 16.—Water Management—Continued

Map symbol and soil name	Pond reservoir areas		Embankments, dikes and levees	
	Rating class and limiting features	Value	Rating class and limiting features	Value
WaD2:				
Mars Hill-----------	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.22
	Slope	0.96	Seepage	0.02
	Depth to bedrock	0.01		
WaE2:				
Walnut--------------	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.94
	Slope	1.00	Seepage	0.02
	Depth to bedrock	0.20		
Oteen---------------	Very limited		Very limited	
	Slope	1.00	Thin layer	1.00
	Depth to bedrock	0.66	Seepage	0.04
	Seepage	0.43		
Mars Hill-----------	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.22
	Slope	1.00	Seepage	0.02
	Depth to bedrock	0.01		
WoF:				
Walnut--------------	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.94
	Slope	1.00	Seepage	0.02
	Depth to bedrock	0.20		
Oteen---------------	Very limited		Very limited	
	Slope	1.00	Thin layer	1.00
	Depth to bedrock	0.66	Seepage	0.04
	Seepage	0.43		
Rock outcrop--------	Not rated		Not rated	
WrC:				
Wayah---------------	Very limited		Somewhat limited	
	Seepage	1.00	Seepage	0.04
	Slope	0.04		
Burton--------------	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.96
	Depth to bedrock	0.96	Seepage	0.02
	Slope	0.04		
WrD:				
Wayah---------------	Very limited		Somewhat limited	
	Seepage	1.00	Seepage	0.04
	Slope	0.96		
Burton--------------	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.96
	Slope	0.96	Seepage	0.02
	Depth to bedrock	0.96		
WrE:				
Wayah---------------	Very limited		Somewhat limited	
	Seepage	1.00	Seepage	0.04
	Slope	1.00		

Table 16.—Water Management—Continued

Map symbol and soil name	Pond reservoir areas		Embankments, dikes and levees	
	Rating class and limiting features	Value	Rating class and limiting features	Value
WrE:				
Burton--------------	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.96
	Slope	1.00	Seepage	0.02
	Depth to bedrock	0.96		
WsF:				
Wayah---------------	Very limited		Somewhat limited	
	Seepage	1.00	Seepage	0.04
	Slope	1.00		
Burton--------------	Very limited		Somewhat limited	
	Seepage	1.00	Thin layer	0.96
	Slope	1.00	Seepage	0.02
	Depth to bedrock	0.96		
WtB:				
Whiteside-----------	Very limited		Somewhat limited	
	Seepage	1.00	Depth to saturated zone	0.86

Table 17.—Engineering Index Properties

(Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
AcD:												
Ashe------------	0-5	Sandy loam	SM, SC-SM, ML	A-4	0-1	0-5	90-100	77-100	54-83	25-45	22-43	3-13
	5-25	Loam, sandy loam, fine sandy loam	SM, SC-SM	A-4	0-1	0-5	87-100	69-100	61-100	39-69	18-33	3-13
	25-30	Gravelly sandy loam, cobbly sandy loam, sandy loam	SM	A-2, A-4, A-2-4	0-1	0-11	80-97	56-97	41-80	19-43	16-27	2-10
	30-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Cleveland-------	0-5	Sandy loam	SM, SC-SM	A-2, A-4, A-2-4	0	0-5	82-100	63-100	44-84	20-46	21-43	3-13
	5-14	Sandy loam	SM, SC-SM	A-2, A-4, A-2-4	0	0-5	82-100	63-100	44-84	20-46	17-33	3-13
	14-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop.												
ArE:												
Ashe------------	0-5	Sandy loam	SC-SM, ML, SM	A-4	0-1	0-5	90-100	77-100	54-83	25-45	22-43	3-13
	5-25	Loam, sandy loam, fine sandy loam	SC-SM, SM	A-4	0-1	0-5	87-100	69-100	61-100	39-69	18-33	3-13
	25-30	Gravelly sandy loam, cobbly sandy loam, sandy loam	SM	A-2, A-2-4, A-4	0-1	0-11	80-97	56-97	41-80	19-43	16-27	2-10
	30-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Cleveland-------	0-5	Sandy loam	SM, SC-SM	A-2, A-2-4, A-4	0	0-5	82-100	63-100	44-84	20-46	21-43	3-13
	5-14	Sandy loam	SC-SM, SM	A-2, A-2-4, A-4	0	0-5	82-100	63-100	44-84	20-46	17-33	3-13
	14-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop.												

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
ArF:												
Ashe	0-5	Sandy loam	SM, SC-SM, ML	A-4	0-1	0-5	90-100	77-100	54-83	25-45	22-43	3-13
	5-25	Loam, sandy loam, fine sandy loam	SM, SC-SM	A-4	0-1	0-5	87-100	69-100	61-100	39-69	18-33	3-13
	25-30	Gravelly sandy loam, cobbly sandy loam, sandy loam	SM	A-2, A-2-4, A-4	0-1	0-11	80-97	56-97	41-80	19-43	16-27	2-10
	30-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Cleveland	0-5	Sandy loam	SC-SM, SM	A-2, A-2-4, A-4	0	0-5	82-100	63-100	44-84	20-46	21-43	3-13
	5-14	Sandy loam	SC-SM, SM	A-2, A-2-4, A-4	0	0-5	82-100	63-100	44-84	20-46	17-33	3-13
	14-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop.												
BaA:												
Biltmore	0-8	Loamy sand	SM	A-2-4, A-4	0	0-5	95-100	84-100	66-85	28-41	12-23	NP-4
	8-80	Fine sand, loamy sand, sand	SP-SM, SM	A-2-4, A-3	0	0-7	95-100	81-100	64-83	19-28	6-14	NP
BkB2:												
Braddock	0-11	Clay loam	CL, SC	A-6, A-7	0	0-5	80-100	61-100	52-98	40-78	35-52	18-28
	11-57	Clay, clay loam, sandy clay, gravelly clay	SC, CL, GC, CH	A-7	0	0-12	86-100	65-100	55-100	44-88	43-64	25-40
	57-80	Loam, gravelly sandy clay loam, sandy clay loam	CL, SC	A-6, A-7	0	0-12	86-100	65-100	55-100	42-81	27-45	12-25
BkC2:												
Braddock	0-11	Clay loam	CL, SC	A-6, A-7	0	0-5	80-100	61-100	52-98	40-78	35-52	18-28
	11-57	Clay, clay loam, sandy clay, gravelly clay	GC, CL, SC, CH	A-7	0	0-12	86-100	65-100	55-100	44-88	43-64	25-40
	57-80	Loam, gravelly sandy clay loam, sandy clay loam	CL, SC	A-6, A-7	0	0-12	86-100	65-100	55-100	42-81	27-45	12-25

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
BkD2:												
Braddock--------	0-11	Clay loam	CL	A-6, A-7	0	0-5	80-100	61-100	52-98	40-78	35-52	18-28
	11-57	Clay, clay loam, sandy clay, gravelly clay	GC, CL, CH, SC	A-7	0	0-12	86-100	65-100	55-100	44-88	43-64	25-40
	57-80	Loam, gravelly sandy clay loam, sandy clay loam	SC, CL	A-6, A-7	0	0-12	86-100	65-100	55-100	42-81	27-45	12-25
BnD:												
Buladean--------	0-3	Loam	SM, SC-SM, ML	A-2-4, A-4	0	0-5	90-100	77-100	62-96	44-72	26-49	7-18
	3-26	Loam, sandy loam, coarse sandy loam	SM, ML, SC-SM	A-2-4, A-4	0	0-5	90-100	77-100	59-92	40-67	16-33	2-13
	26-50	Coarse sandy loam, sandy loam, loamy sand	SM, SC-SM	A-2-4, A-4	0	0-4	84-100	66-100	37-72	20-46	0-30	NP-12
	50-80	Weathered bedrock			---	---	---	---	---	---	---	---
Chestnut--------	0-2	Loam	SM, SC-SM, ML	A-4, A-5, A-2	0	0-5	87-100	70-100	56-95	38-69	20-43	2-13
	2-27	Loam, gravelly fine sandy loam, sandy loam	SC-SM, SM, ML	A-2, A-4, A-5	0-5	0-16	78-100	48-100	37-92	25-67	16-33	2-13
	27-80	Weathered bedrock			---	---	---	---	---	---	---	---
BnE:												
Buladean--------	0-3	Loam	ML, SM, SC-SM	A-2-4, A-4	0	0-5	90-100	77-100	62-96	44-72	26-49	7-18
	3-26	Loam, sandy loam, coarse sandy loam	SM, SC-SM, ML	A-2-4, A-4	0	0-5	90-100	77-100	59-92	40-67	16-33	2-13
	26-50	Coarse sandy loam, sandy loam, loamy sand	SM, SC-SM	A-2-4, A-4	0	0-4	84-100	66-100	37-72	20-46	0-30	NP-12
	50-80	Weathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
BnE:												
Chestnut--------	0-2	Loam	SM, SC-SM, ML	A-4, A-5, A-2	0	0-5	87-100	70-100	56-95	38-69	20-43	2-13
	2-27	Loam, gravelly fine sandy loam, sandy loam	ML, SM, SC-SM	A-2, A-4, A-5	0-5	0-16	78-100	48-100	37-92	25-67	16-33	2-13
	27-80	Weathered bedrock			---	---	---	---	---	---	---	---
BnF:												
Buladean--------	0-3	Loam	ML, SC-SM, SM	A-2-4, A-4	0	0-5	90-100	77-100	62-96	44-72	26-49	7-18
	3-26	Loam, sandy loam, coarse sandy loam	ML, SC-SM, SM	A-2-4, A-4	0	0-5	90-100	77-100	59-92	40-67	16-33	2-13
	26-50	Coarse sandy loam, sandy loam, loamy sand	SM, SC-SM	A-2-4, A-4	0	0-4	84-100	66-100	37-72	20-46	0-30	NP-12
	50-80	Weathered bedrock			---	---	---	---	---	---	---	---
Chestnut--------	0-2	Loam	ML, SM, SC-SM	A-2, A-5, A-4	0	0-5	87-100	70-100	56-95	38-69	20-43	2-13
	2-27	Loam, gravelly fine sandy loam, sandy loam	ML, SM, SC-SM	A-2, A-4, A-5	0-5	0-16	78-100	48-100	37-92	25-67	16-33	2-13
	27-80	Weathered bedrock			---	---	---	---	---	---	---	---
CaD:												
Calvin----------	0-8	Channery silt loam	GM, ML, SM	A-2-4, A-4	0-5	10-20	60-80	50-80	30-80	25-75	20-40	NP-10
	8-26	Very channery silt loam, very channery very fine sandy loam	ML, GM	A-1-b, A-2-4, A-4	8-15	20-50	40-80	30-80	25-80	20-60	20-40	NP-10
	26-35	Extremely channery silt loam, channery loam, very channery silt loam	GC-GM, GM	A-1, A-2	7-18	27-45	30-50	25-40	20-40	15-35	0-30	NP-7
	35-80	Weathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
CaE:												
Calvin----------	0-8	Channery silt loam	ML, SM, GM	A-2-4, A-4	0-5	10-20	60-80	50-80	30-80	25-75	20-40	NP-10
	8-26	Very channery silt loam, very channery very fine sandy loam	ML, GM	A-1-b, A-2-4, A-4	8-15	20-50	40-80	30-80	25-80	20-60	20-40	NP-10
	26-35	Extremely channery silt loam, channery loam, very channery silt loam	GC-GM, GM	A-1, A-2	7-18	27-45	30-50	25-40	20-40	15-35	0-30	NP-7
	35-80	Weathered bedrock			---	---	---	---	---	---	---	---
CaF:												
Calvin----------	0-8	Channery silt loam	GM, ML, SM	A-2-4, A-4	0-5	10-20	60-80	50-80	30-80	25-75	20-40	NP-10
	8-26	Very channery silt loam, very channery very fine sandy loam	GM, ML	A-1-b, A-2-4, A-4	8-15	20-50	40-80	30-80	25-80	20-60	20-40	NP-10
	26-35	Extremely channery silt loam, channery loam, very channery silt loam	GM, GC-GM	A-1, A-2	7-18	27-45	30-50	25-40	20-40	15-35	0-30	NP-7
	35-80	Weathered bedrock			---	---	---	---	---	---	---	---
CfF:												
Cataska---------	0-4	Channery silt loam	GM, SM, ML	A-2-4, A-4	0-5	10-20	60-80	50-80	30-80	25-75	20-40	NP-10
	4-12	Channery silt loam, channery loam, very channery silt loam	GP-GM, GC-GM, GM	A-1, A-2	0-2	10-25	15-50	10-45	10-40	10-35	0-30	NP-7
	12-28	Weathered bedrock			---	---	---	---	---	---	---	---
	28-80	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
CfF:												
Sylco-----------	0-5	Channery loam, very channery loam	GC, GC-GM, GM, SC	A-1-b, A-2-4, A-4	0-2	0-9	61-74	24-74	20-69	14-51	29-47	9-17
	5-23	Very channery loam, channery silty clay loam, extremely channery silt loam	GM, GC-GM, GC	A-2, A-4, A-6	0	0	100	100	85-100	72-87	20-37	6-17
	23-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop.												
ChD:												
Cheoah----------	0-12	Loam	CL-ML, ML	A-4, A-5, A-7-5	0	0	100	100	80-95	54-69	33-64	5-16
	12-38	Loam, fine sandy loam, silt loam	CL-ML, ML	A-4	0	0	100	100	81-94	55-68	16-31	2-12
	38-51	Channery loam, channery fine sandy loam, channery silt loam	CL-ML, ML	A-4	0	0	100	100	77-97	52-72	16-37	2-17
	51-80	Weathered bedrock			---	---	---	---	---	---	---	---
Jeffrey---------	0-8	Loam	CL-ML, ML	A-4, A-5, A-7-5	0	0	100	100	80-95	54-69	33-64	5-16
	8-31	Channery loam, channery fine sandy loam, channery silt loam	ML, CL-ML	A-4	0	0	100	100	77-97	52-72	16-37	2-17
	31-80	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
ChE:												
Cheoah----------	0-12	Loam	ML, CL-ML	A-4, A-5, A-7-5	0	0	100	100	80-95	54-69	33-64	5-16
	12-38	Loam, fine sandy loam, silt loam	ML, CL-ML	A-4	0	0	100	100	81-94	55-68	16-31	2-12
	38-51	Channery loam, channery fine sandy loam, channery silt loam	ML, CL-ML	A-4	0	0	100	100	77-97	52-72	16-37	2-17
	51-80	Weathered bedrock			---	---	---	---	---	---	---	---
Jeffrey---------	0-8	Loam	ML, CL-ML	A-4, A-5, A-7-5	0	0	100	100	80-95	54-69	33-64	5-16
	8-31	Channery loam, channery fine sandy loam, channery silt loam	ML, CL-ML	A-4	0	0	100	100	77-97	52-72	16-37	2-17
	31-80	Unweathered bedrock			---	---	---	---	---	---	---	---
ChF:												
Cheoah----------	0-12	Loam	ML, CL-ML	A-4, A-5, A-7-5	0	0	100	100	80-95	54-69	33-64	5-16
	12-38	Loam, fine sandy loam, silt loam	CL-ML, ML	A-4	0	0	100	100	81-94	55-68	16-31	2-12
	38-51	Channery loam, channery fine sandy loam, channery silt loam	ML, CL-ML	A-4	0	0	100	100	77-97	52-72	16-37	2-17
	51-80	Weathered bedrock			---	---	---	---	---	---	---	---
Jeffrey---------	0-8	Loam	CL-ML, ML	A-4, A-5, A-7-5	0	0	100	100	80-95	54-69	33-64	5-16
	8-31	Channery loam, channery fine sandy loam, channery silt loam	CL-ML, ML	A-4	0	0	100	100	77-97	52-72	16-37	2-17
	31-80	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
CsD:												
Chestoa---------	0-13	Sandy loam	SM, SC-SM	A-2-4, A-4	0	0	86-100	64-100	46-82	23-45	33-61	5-13
	13-26	Channery sandy loam, channery loamy sand, loam	CL-ML, ML	A-4	0	0	100	100	70-85	32-47	16-33	2-13
	26-80	Unweathered bedrock			---	---	---	---	---	---	---	---
CsE:												
Chestoa---------	0-13	Sandy loam	SC-SM, SM	A-2-4, A-4	0	0	86-100	64-100	46-82	23-45	33-61	5-13
	13-26	Channery sandy loam, channery loamy sand, loam	CL-ML, ML	A-4	0	0	100	100	70-85	32-47	16-33	2-13
	26-80	Unweathered bedrock			---	---	---	---	---	---	---	---
CsF:												
Chestoa---------	0-13	Sandy loam	SC-SM, SM	A-2-4, A-4	0	0	86-100	64-100	46-82	23-45	33-61	5-13
	13-26	Channery sandy loam, channery loamy sand, loam	CL-ML, ML	A-4	0	0	100	100	70-85	32-47	16-33	2-13
	26-80	Unweathered bedrock			---	---	---	---	---	---	---	---
CtB2:												
Clifton---------	0-8	Clay loam	CL, ML	A-4, A-5, A-6, A-7	0	0-5	89-100	78-100	66-98	51-78	35-52	18-28
	8-55	Clay, clay loam	ML, MH	A-7, A-7-5	0	0-5	95-100	81-100	68-100	55-88	43-64	25-40
	55-80	Fine sandy loam, loam	SM, SC, CL, ML	A-4, A-6	0-6	0-13	88-100	72-100	51-92	23-54	16-38	2-19
CtC2:												
Clifton---------	0-8	Clay loam	CL, ML	A-4, A-5, A-6, A-7	0	0-5	89-100	78-100	66-98	51-78	35-52	18-28
	8-55	Clay, clay loam	ML, MH	A-7, A-7-5	0	0-5	95-100	81-100	68-100	55-88	43-64	25-40
	55-80	Fine sandy loam, loam	CL, ML, SC, SM	A-4, A-6	0-6	0-13	88-100	72-100	51-92	23-54	16-38	2-19
CtD2:												
Clifton---------	0-8	Clay loam	CL, ML	A-4, A-5, A-6, A-7	0	0-5	89-100	78-100	66-98	51-78	35-52	18-28
	8-55	Clay, clay loam	MH, ML	A-7, A-7-5	0	0-5	95-100	81-100	68-100	55-88	43-64	25-40
	55-80	Fine sandy loam, loam	CL, ML, SM, SC	A-4, A-6	0-6	0-13	88-100	72-100	51-92	23-54	16-38	2-19

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
CtE2:												
Clifton---------	0-8	Clay loam	CL, ML	A-4, A-5, A-6, A-7	0	0-5	89-100	78-100	66-98	51-78	35-52	18-28
	8-55	Clay, clay loam	ML, MH	A-7, A-7-5	0	0-5	95-100	81-100	68-100	55-88	43-64	25-40
	55-80	Fine sandy loam, loam	ML, SM, CL, SC	A-4, A-6	0-6	0-13	88-100	72-100	51-92	23-54	16-38	2-19
CxC:												
Clifton---------	0-8	Clay loam	ML, CL	A-4, A-5, A-6, A-7	0	0-5	89-100	78-100	66-98	51-78	35-49	18-28
	8-55	Clay, clay loam	MH, ML	A-7, A-7-5	0	0-5	95-100	81-100	68-100	55-88	43-64	25-40
	55-80	Fine sandy loam, loam	SC, SM, CL, ML	A-4, A-6	0-6	0-13	88-100	72-100	51-92	23-54	16-38	2-19
Urban land.												
DeA:												
Dellwood--------	0-8	Gravelly fine sandy loam	SM	A-1-b, A-2-4, A-4	0-1	0-14	73-88	51-88	44-84	19-41	25-44	2-9
	8-16	Extremely gravelly sand, very gravelly sand, very gravelly loamy sand	GM, GW-GM, GP, GP-GM	A-1, A-1-a	0-5	10-23	47-83	7-83	5-67	0-11	8-12	NP
	16-80	Extremely gravelly sand, very cobbly sand, extremely gravelly coarse sand	GW-GM, GP, GM, GP-GM	A-1, A-1-a	0-5	25-40	47-89	7-77	3-35	0-7	8-12	NP
Reddies---------	0-14	Sandy loam, fine sandy loam, loam	SM	A-2-4, A-4	0	0-5	90-100	71-100	51-85	25-47	25-46	2-12
	14-26	Fine sandy loam, sandy loam, gravelly sandy loam	SM	A-1-b, A-2-4, A-4	0-1	0-13	75-100	41-100	35-98	15-49	16-31	2-12
	26-80	Extremely gravelly sand, very gravelly sand, very cobbly sand	SM, SP-SM, GP-GM, GM	A-1	0-5	10-50	13-75	10-55	4-40	1-15	8-12	NP

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
DrB:												
Dillard---------	0-7	Loam	CL, ML	A-4	0	0-1	95-100	84-100	67-96	47-71	29-52	5-17
	7-50	Clay loam, sandy clay loam, loam	CL	A-6, A-7	0	0-1	95-100	82-100	67-99	51-79	27-45	12-25
	50-80	Sandy loam	SM	A-2-4	0	0	100	100	69-82	31-44	16-31	2-12
DtD:												
Ditney----------	0-7	Fine sandy loam	CL-ML, SM, SC-SM, ML	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	7-25	Loam, sandy loam, fine sandy loam	CL-ML, ML, SC-SM, SM	A-4	0	0-4	91-100	74-100	65-100	42-70	16-31	2-12
	25-30	Cobbly sandy loam, cobbly loam, sandy loam, loam	SC-SM, ML, CL-ML, SM	A-2-4, A-4	0	4-25	71-100	38-100	33-100	22-70	16-31	2-12
	30-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Unicoi----------	0-5	Cobbly sandy loam, cobbly loam	SC-SM, SM	A-2-4, A-2	0-5	5-22	73-90	51-90	44-90	28-62	20-43	2-13
	5-16	Very cobbly loam, very cobbly sandy loam, very stony loam	GC-GM, GM, SC-SM, SM	A-2-4, A-2	0	17-40	68-87	39-87	34-87	21-60	16-33	2-13
	16-80	Unweathered bedrock			---	---	---	---	---	---	---	---
DuE:												
Ditney----------	0-7	Fine sandy loam	ML, CL-ML, SM, SC-SM	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	7-25	Loam, sandy loam, fine sandy loam	SC-SM, CL-ML, ML, SM	A-4	0	0-4	91-100	74-100	65-100	42-70	16-31	2-12
	25-30	Cobbly sandy loam, cobbly loam, sandy loam, loam	SC-SM, SM, ML, CL-ML	A-2-4, A-4	0	4-25	71-100	38-100	33-100	22-70	16-31	2-12
	30-80	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
DuE:												
Unicoi----------	0-5	Cobbly sandy loam, cobbly loam	SM, SC-SM	A-2-4, A-2	0-5	5-22	73-90	51-90	44-90	28-62	20-43	2-13
	5-16	Very cobbly loam, very cobbly sandy loam, very stony loam	SM, SC-SM, GC-GM, GM	A-2-4, A-2	0	17-40	68-87	39-87	34-87	21-60	16-33	2-13
	16-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop.												
DuF:												
Ditney----------	0-7	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	7-25	Loam, sandy loam, fine sandy loam	CL-ML, ML, SC-SM, SM	A-4	0	0-4	91-100	74-100	65-100	42-70	16-31	2-12
	25-30	Cobbly sandy loam, cobbly loam, sandy loam, loam	SC-SM, SM, ML, CL-ML	A-2-4, A-4	0	4-25	71-100	38-100	33-100	22-70	16-31	2-12
	30-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Unicoi----------	0-5	Cobbly sandy loam, cobbly loam	SM, SC-SM	A-2-4, A-2	0-5	5-22	73-90	51-90	44-90	28-62	20-43	2-13
	5-16	Very cobbly loam, very cobbly sandy loam, very stony loam	SM, SC-SM, GM, GC-GM	A-2-4, A-2	0	17-40	68-87	39-87	34-87	21-60	16-33	2-13
	16-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop.												

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
EdD:												
Edneyville------	0-5	Fine sandy loam	SC-SM, ML, SM	A-2, A-4, A-5	0-3	0-5	84-96	64-96	55-95	26-52	20-42	2-12
	5-43	Fine sandy loam, sandy loam, loam	SM, SC-SM	A-2, A-4	0-3	0-5	87-100	68-100	59-100	25-49	18-33	3-13
	43-80	Sandy loam, gravelly sandy loam, fine sandy loam	SM, SC-SM	A-2, A-4	0-5	0-12	89-100	71-100	49-84	22-46	16-32	2-13
Chestnut--------	0-4	Gravelly fine sandy loam	SM, SC-SM	A-2, A-4, A-5	0-5	5-13	79-96	53-96	45-96	18-48	20-43	2-13
	4-36	Gravelly fine sandy loam, gravelly loam, sandy loam, cobbly fine sandy loam	SM, SC-SM	A-2, A-4	0-5	0-23	77-98	45-98	36-98	23-71	16-37	2-17
	36-80	Weathered bedrock			---	---	---	---	---	---	---	---
EdE:												
Edneyville------	0-5	Fine sandy loam	SC-SM, ML, SM	A-2, A-4, A-5	0-3	0-5	84-96	64-96	55-95	26-52	20-42	2-12
	5-43	Fine sandy loam, sandy loam, loam	SM, SC-SM	A-2, A-4	0-3	0-5	87-100	68-100	59-100	25-49	18-33	3-13
	43-80	Sandy loam, gravelly sandy loam, fine sandy loam	SC-SM, SM	A-2, A-4	0-5	0-12	89-100	71-100	49-84	22-46	16-32	2-13
Chestnut--------	0-4	Gravelly fine sandy loam	SM, SC-SM	A-2, A-4, A-5	0-5	5-13	79-96	53-96	45-96	18-48	20-43	2-13
	4-36	Gravelly fine sandy loam, gravelly loam, sandy loam, cobbly fine sandy loam	SM, SC-SM	A-2, A-4	0-5	0-23	77-98	45-98	36-98	23-71	16-37	2-17
	36-80	Weathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
EdF:												
Edneyville------	0-5	Fine sandy loam	SM, SC-SM, ML	A-2, A-4, A-5	0-3	0-5	84-96	64-96	55-95	26-52	20-42	2-12
	5-43	Fine sandy loam, sandy loam, loam	SM, SC-SM	A-2, A-4	0-3	0-5	87-100	68-100	59-100	25-49	18-33	3-13
	43-80	Sandy loam, gravelly sandy loam, fine sandy loam	SM, SC-SM	A-2, A-4	0-5	0-12	89-100	71-100	49-84	22-46	16-32	2-13
Chestnut--------	0-4	Gravelly fine sandy loam	SC-SM, SM	A-2, A-4, A-5	0-5	5-13	79-96	53-96	45-96	18-48	20-43	2-13
	4-36	Gravelly fine sandy loam, gravelly loam, sandy loam, cobbly fine sandy loam	SC-SM, SM	A-2, A-4	0-5	0-23	77-98	45-98	36-98	23-71	16-37	2-17
	36-80	Weathered bedrock			---	---	---	---	---	---	---	---
EfA:												
Ela, drained----	0-13	Loam, fine sandy loam, sandy loam, coarse sandy loam	SM, ML	A-2-4, A-4	0	0-5	90-100	71-100	53-88	26-50	34-55	2-11
	13-38	Gravelly sandy loam, gravelly fine sandy loam, gravelly loam, gravelly coarse sandy loam	SM	A-2-4, A-4, A-1-b	0	0-17	82-92	50-75	36-64	17-36	16-30	2-12
	38-80	Very cobbly sandy loam, extremely gravelly coarse sand, very cobbly loamy sand	SC-SM, GC-GM, GM	A-1-b, A-2-4	17-40	22-59	58-100	15-100	10-86	5-48	0-30	NP-12

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
EfA:												
Ela, undrained--	0-15	Fine sandy loam, sandy loam, loam, coarse sandy loam, silt loam	ML, SM	A-2-4, A-4	0	0-5	90-100	80-99	50-93	17-55	15-37	NP-4
	15-28	Gravelly sandy loam, gravelly fine sandy loam, gravelly loam, gravelly coarse sandy loam	SM	A-2-4, A-4, A-1-b	0-1	0-15	70-85	60-75	30-65	5-45	15-37	NP-4
	28-80	Very gravelly sand, extremely gravelly coarse sand, very cobbly loamy sand, extremely cobbly sandy loam	GM, GP-GM, SP-SM, SM	A-1	0-20	10-70	30-45	20-50	15-40	5-25	0-19	NP-2
EvD2:												
Evard-----------	0-5	Clay loam	SM, SC, ML, CL	A-2, A-4, A-6, A-7-6	0	0-1	90-100	75-100	65-96	50-77	33-47	17-24
	5-29	Sandy clay loam, clay loam, loam	SM, ML, SC, CL	A-2, A-4, A-6, A-7-6	0	0-1	90-100	76-100	60-95	32-59	27-45	12-25
	29-37	Sandy loam, loam, sandy clay loam	CL, ML, SC-SM	A-2, A-4	0	0-5	82-100	59-100	43-81	22-45	22-33	7-13
	37-80	Sandy loam, loam, loamy sand	SC-SM	A-2-4, A-4	0	0-15	77-100	49-100	34-84	15-46	16-32	2-13
Cowee-----------	0-5	Clay loam	SM, CL, ML, SC	A-2, A-4, A-6, A-7-6	0	0-1	90-100	75-100	65-96	50-77	33-47	17-24
	5-27	Gravelly sandy clay loam, gravelly sandy loam, clay loam	CL, ML, SC, SM	A-2, A-4, A-6, A-7	0-1	0-13	71-92	37-76	29-72	16-45	27-45	12-25
	27-80	Weathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
EvE2:												
Evard-----------	0-5	Clay loam	CL, SM, SC, ML	A-2, A-4, A-6, A-7-6	0	0-1	90-100	75-100	65-96	50-77	33-47	17-24
	5-29	Sandy clay loam, clay loam, loam	SM, SC, ML, CL	A-2, A-4, A-6, A-7-6	0	0-1	90-100	76-100	60-95	32-59	27-45	12-25
	29-37	Sandy loam, loam, sandy clay loam	SC-SM, ML, CL	A-2, A-4	0	0-5	82-100	59-100	43-81	22-45	22-33	7-13
	37-80	Sandy loam, loam, loamy sand	SC-SM	A-2-4, A-4	0	0-15	77-100	49-100	34-84	15-46	16-32	2-13
Cowee-----------	0-5	Clay loam	CL, ML, SC, SM	A-2, A-4, A-6, A-7-6	0	0-1	90-100	75-100	65-96	50-77	33-47	17-24
	5-27	Gravelly sandy clay loam, gravelly sandy loam, clay loam	ML, SC, SM, CL	A-2, A-4, A-6, A-7	0-1	0-13	71-92	37-76	29-72	16-45	27-45	12-25
	27-80	Weathered bedrock			---	---	---	---	---	---	---	---
EvF2:												
Evard-----------	0-5	Clay loam	CL, ML, SC, SM	A-2, A-4, A-6, A-7-6	0	0-1	90-100	75-100	65-96	50-77	37-56	17-24
	5-29	Sandy clay loam, clay loam, loam	SM, SC, ML, CL	A-2, A-4, A-6, A-7-6	0	0-1	90-100	76-100	60-95	32-59	27-45	12-25
	29-37	Sandy loam, loam, sandy clay loam	SC-SM, ML, CL	A-2, A-4	0	0-5	82-100	59-100	43-81	22-45	22-33	7-13
	37-80	Sandy loam, loam, loamy sand	SC-SM	A-2-4, A-4	0	0-15	77-100	49-100	34-84	15-46	16-32	2-13
Cowee-----------	0-5	Clay loam	CL, ML, SC, SM	A-2, A-4, A-6, A-7-6	0	0-1	90-100	75-100	65-96	50-77	37-56	17-24
	5-27	Gravelly sandy clay loam, gravelly sandy loam, clay loam	SM, SC, ML, CL	A-2, A-4, A-6, A-7	0-1	0-13	71-92	37-76	29-72	16-45	27-45	12-25
	27-80	Weathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
EwD:												
Evard-----------	0-5	Loam, fine sandy loam	ML, SM	A-2, A-4	0	0-5	83-100	75-100	54-100	22-50	20-43	2-13
	5-32	Clay loam, sandy clay loam	CL, SC	A-2, A-6, A-7-6	0	0-1	90-100	76-100	60-95	32-59	27-45	12-25
	32-45	Loam, fine sandy loam, sandy clay loam	SC, CL	A-2, A-4	0	0-5	81-100	61-100	52-100	22-54	22-40	7-21
	45-80	Sandy loam, loam, loamy sand	SM, SC-SM	A-4, A-2-4	0	0-15	82-100	64-100	44-84	20-46	16-32	2-13
Cowee-----------	0-5	Sandy loam	ML, SC-SM, SM	A-2, A-2-4, A-4, A-5, A-2-5	0-1	0-5	90-100	76-100	54-83	25-45	23-43	4-13
	5-38	Clay loam, gravelly sandy loam, gravelly sandy clay loam	ML, SM, SC, CL	A-2, A-4, A-6, A-7	0-1	0-13	86-98	69-98	53-92	31-61	27-45	12-25
	38-80	Weathered bedrock			---	---	---	---	---	---	---	---
EwE:												
Evard-----------	0-5	Loam, fine sandy loam	SM, ML	A-2, A-4	0	0-5	83-100	75-100	54-100	22-50	20-43	2-13
	5-32	Clay loam, sandy clay loam	CL, SC	A-2, A-6, A-7-6	0	0-1	90-100	76-100	60-95	32-59	27-45	12-25
	32-45	Loam, fine sandy loam, sandy clay loam	CL, SC	A-2, A-4	0	0-5	81-100	61-100	52-100	22-54	22-40	7-21
	45-80	Sandy loam, loam, loamy sand	SM, SC-SM	A-4, A-2-4	0	0-15	82-100	64-100	44-84	20-46	16-32	2-13

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
EwE:												
Cowee-----------	0-5	Sandy loam	ML, SC-SM, SM	A-2, A-2-4, A-4, A-5, A-2-5	0-2	0-5	90-100	85-100	60-85	30-55	26-41	NP-12
	5-38	Clay loam, gravelly sandy loam, gravelly sandy clay loam	CL, SC, SM, ML	A-2, A-4, A-6, A-7	0-2	0-15	47-99	45-90	32-85	17-60	26-50	5-22
	38-80	Weathered bedrock			---	---	---	---	---	---	---	---
EwF:												
Evard-----------	0-5	Loam, fine sandy loam	SM, ML	A-2, A-4	0	0-5	83-100	75-100	54-100	22-50	20-43	2-13
	5-32	Clay loam, sandy clay loam	SC, CL	A-2, A-6, A-7-6	0	0-1	90-100	76-100	60-95	32-59	27-45	12-25
	32-45	Loam, fine sandy loam, sandy clay loam	SC, CL	A-2, A-4	0	0-5	81-100	61-100	52-100	22-54	22-40	7-21
	45-80	Sandy loam, loam, loamy sand	SC-SM, SM	A-4, A-2-4	0	0-15	82-100	64-100	44-84	20-46	16-32	2-13
Cowee-----------	0-5	Sandy loam	ML, SC-SM, SM	A-2, A-2-4, A-4, A-5, A-2-5	0-2	0-5	90-100	85-100	60-85	30-55	26-41	NP-12
	5-38	Clay loam, gravelly sandy loam, gravelly sandy clay loam	CL, SC, SM, ML	A-2, A-4, A-6, A-7	0-2	0-15	47-99	45-90	32-85	17-60	26-50	5-22
	38-80	Weathered bedrock			---	---	---	---	---	---	---	---
FnD2:												
Fannin----------	0-2	Sandy clay loam	SM, ML, MH	A-2, A-4, A-6, A-7	0-1	0-10	89-100	75-100	59-94	33-59	29-47	13-24
	2-31	Sandy clay loam, clay loam, loam	MH, ML, SM	A-4, A-6, A-7	0	1-10	96-100	85-100	67-95	36-59	27-45	12-25
	31-80	Fine sandy loam, sandy loam, loam	SM, ML	A-2, A-4, A-5	0	0-7	84-100	64-100	53-100	22-54	16-36	2-17

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
FrA:												
French----------	0-12	Loam	CL, CL-ML, SC, SC-SM	A-4, A-6	0-1	0-13	95-100	84-100	66-98	46-73	27-53	4-18
	12-30	Loam, fine sandy loam, sandy clay loam	CL, SC, SC-SM	A-4, A-6, A-7	0	0-14	89-100	75-100	52-96	24-59	18-45	4-25
	30-80	Extremely gravelly sand, very gravelly loamy sand, very cobbly sand	SM, GP-GM, GM, SP-SM	A-1-a	0-5	10-40	58-89	8-89	7-74	2-22	8-12	NP
HcE:												
Heintooga-------	0-12	Very flaggy loam	GC-GM, GC	A-4, A-2-4	21-34	40-56	44-66	43-65	34-65	23-51	42-77	5-16
	12-25	Extremely channery fine sandy loam	GC-GM, GM	A-2-4, A-1-a	5-19	38-57	14-47	12-46	11-46	6-26	16-28	2-10
	25-80	Extremely flaggy coarse sandy loam	SM, SC-SM	A-1-b, A-2-4	23-63	35-59	19-73	18-72	11-51	6-31	16-28	2-10
Chiltoskie------	0-8	Loam	CL	A-6	0	0-9	90-100	89-100	76-98	54-72	49-81	11-19
	8-43	Loam	CL	A-4, A-6	0	0-12	86-100	86-100	72-98	49-72	20-37	6-17
	43-80	Very channery sandy loam	SM, SC-SM	A-2-4, A-1-b	0	25-35	40-70	30-50	25-45	15-40	16-28	2-10
HpA:												
Hemphill--------	0-13	Clay loam	CL, CH	A-6, A-7	0	0	94-100	89-100	75-98	58-78	35-49	18-28
	13-38	Clay, silty clay, clay loam	ML, MH	A-6, A-7	0	0	94-100	89-100	71-100	60-92	43-74	24-42
	38-80	Fine sandy loam, loam, clay loam	SM, SC-SM, ML	A-4, A-5, A-6, A-7	0	0	95-100	84-100	64-100	30-63	18-44	4-25

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
JbD:												
Junaluska-------	0-2	Fine sandy loam, loam, silt loam	ML, CL	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	2-11	Fine sandy loam, loam, silt loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	11-21	Sandy clay loam, channery clay loam, channery loam	CL	A-6, A-7	0-4	0-15	87-100	87-100	72-99	50-75	27-45	12-25
	21-26	Fine sandy loam, loam, silt loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	26-80	Weathered bedrock			---	---	---	---	---	---	---	---
Brasstown-------	0-6	Loam	SM, ML	A-4, A-5, A-7	0-5	0-17	84-100	84-100	68-94	47-68	20-42	2-12
	6-36	Loam, clay loam, channery clay loam, channery loam	CL	A-6, A-7-6	0-4	0-15	87-100	87-100	71-99	52-77	27-45	12-25
	36-45	Loam, channery very fine sandy loam, channery fine sandy loam	CL	A-4	0-4	0-14	87-100	87-100	66-88	33-50	18-32	4-13
	45-80	Weathered bedrock			---	---	---	---	---	---	---	---
JbE:												
Junaluska-------	0-2	Fine sandy loam, loam, silt loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	2-11	Fine sandy loam, loam, silt loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	11-21	Sandy clay loam, channery clay loam, channery loam	CL	A-6, A-7	0-4	0-15	87-100	87-100	72-99	50-75	27-45	12-25
	21-26	Fine sandy loam, loam, silt loam	ML, CL	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	26-80	Weathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
JbE:												
Brasstown-------	0-6	Loam	SM, ML	A-5, A-7, A-4	0-5	0-17	84-100	84-100	68-94	47-68	20-42	2-12
	6-36	Loam, clay loam, channery clay loam, channery loam	CL	A-6, A-7-6	0-4	0-15	87-100	87-100	71-99	52-77	27-45	12-25
	36-45	Loam, channery very fine sandy loam, channery fine sandy loam	CL	A-4	0-4	0-14	87-100	87-100	66-88	33-50	18-32	4-13
	45-80	Weathered bedrock			---	---	---	---	---	---	---	---
JbF:												
Junaluska-------	0-2	Fine sandy loam, loam, silt loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	2-11	Fine sandy loam, loam, silt loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	11-21	Sandy clay loam, channery clay loam, channery loam	CL	A-6, A-7	0-4	0-15	87-100	87-100	72-99	50-75	27-45	12-25
	21-26	Fine sandy loam, loam, silt loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	26-80	Weathered bedrock			---	---	---	---	---	---	---	---
Brasstown-------	0-6	Loam	SM, ML	A-5, A-7, A-4	0-5	0-17	84-100	84-100	68-94	47-68	20-42	2-12
	6-36	Loam, clay loam, channery clay loam, channery loam	CL	A-6, A-7-6	0-4	0-15	87-100	87-100	71-99	52-77	27-45	12-25
	36-45	Loam, channery very fine sandy loam, channery fine sandy loam	CL	A-4	0-4	0-14	87-100	87-100	66-88	33-50	18-32	4-13
	45-80	Weathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
KnC:												
Keener----------	0-7	Loam	CL, CL-ML, ML	A-4	0	0-5	97-100	83-100	65-98	44-74	22-49	3-18
	7-38	Cobbly clay loam, cobbly sandy clay loam, clay loam	ML, CL-ML, CL	A-4	0	0-17	82-100	65-100	50-100	37-82	20-45	6-25
	38-80	Gravelly loam, very cobbly sandy loam	CL-ML, SM, SC-SM, SC	A-4	0	5-39	73-91	37-74	29-74	20-59	20-44	6-25
MwC:												
Mars Hill-------	0-3	Fine sandy loam	SC-SM, SM, ML, CL-ML	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	3-9	Fine sandy loam, loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	56-95	38-69	16-32	2-13
	9-35	Fine sandy loam, loam, sandy loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	57-97	37-68	16-33	2-13
	35-46	Fine sandy loam, sandy loam, gravelly sandy loam	SC-SM, SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-100	13-46	16-32	2-13
	46-80	Weathered bedrock			---	---	---	---	---	---	---	---
Walnut----------	0-2	Fine sandy loam	SM, CL-ML, ML, SC-SM	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	2-9	Fine sandy loam, loam	SM, SC-SM, ML	A-4	0	0-5	87-100	70-100	56-95	38-69	16-32	2-13
	9-21	Loam, fine sandy loam, sandy loam	SC-SM, SM, ML	A-4	0	0-5	87-100	70-100	56-95	38-69	16-33	2-13
	21-27	Gravelly fine sandy loam, gravelly sandy loam, loam	SC-SM, SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-100	13-46	16-32	2-13
	27-80	Weathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
MwD: Mars Hill-------	0-3	Fine sandy loam	SM, SC-SM, ML, CL-ML	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	3-9	Fine sandy loam, loam	SM, SC-SM, ML	A-4	0	0-5	87-100	70-100	56-95	38-69	16-32	2-13
	9-35	Fine sandy loam, loam, sandy loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	57-97	37-68	16-33	2-13
	35-46	Fine sandy loam, sandy loam, gravelly sandy loam	SC-SM, SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-100	13-46	16-32	2-13
	46-80	Weathered bedrock			---	---	---	---	---	---	---	---
Walnut----------	0-2	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	2-9	Fine sandy loam, loam	SC-SM, SM, ML	A-4	0	0-5	87-100	70-100	56-95	38-69	16-32	2-13
	9-21	Loam, fine sandy loam, sandy loam	SM, ML, SC-SM	A-4	0	0-5	87-100	70-100	56-95	38-69	16-33	2-13
	21-27	Gravelly fine sandy loam, gravelly sandy loam, loam	SC-SM, SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-100	13-46	16-33	2-13
	27-80	Weathered bedrock			---	---	---	---	---	---	---	---
MwE: Mars Hill-------	0-2	Fine sandy loam	CL-ML, SM, ML, SC-SM	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	2-9	Fine sandy loam, loam	SM, SC-SM, ML	A-4	0	0-5	87-100	70-100	56-95	38-69	16-32	2-13
	9-35	Fine sandy loam, loam, sandy loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	57-97	37-68	16-33	2-13
	35-46	Fine sandy loam, sandy loam, gravelly sandy loam	SC-SM, SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-100	13-46	16-32	2-13
	46-80	Weathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
MwE:												
Walnut----------	0-3	Fine sandy loam	SM, SC-SM, ML, CL-ML	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	3-9	Fine sandy loam, loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	56-95	38-69	16-32	2-13
	9-21	Loam, fine sandy loam, sandy loam	SM, ML, SC-SM	A-4	0	0-5	87-100	70-100	56-95	38-69	16-33	2-13
	21-27	Gravelly fine sandy loam, gravelly sandy loam, loam	SC-SM, SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-100	13-46	16-33	2-13
	27-80	Weathered bedrock			---	---	---	---	---	---	---	---
MwF:												
Mars Hill-------	0-3	Fine sandy loam	SM, CL-ML, ML, SC-SM	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	3-9	Fine sandy loam, loam	SM, SC-SM, ML	A-4	0	0-5	87-100	70-100	56-95	38-69	16-32	2-13
	9-35	Fine sandy loam, loam, sandy loam	SM, ML, SC-SM	A-4	0	0-5	87-100	70-100	57-97	37-68	16-33	2-13
	35-46	Fine sandy loam, sandy loam, gravelly sandy loam	SC-SM, SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-100	13-46	16-32	2-13
	46-80	Weathered bedrock			---	---	---	---	---	---	---	---
Walnut----------	0-2	Fine sandy loam	SM, SC-SM, ML, CL-ML	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	2-9	Fine sandy loam, loam	SC-SM, ML, SM	A-4	0	0-5	87-100	70-100	56-95	38-69	16-32	2-13
	9-21	Loam, fine sandy loam, sandy loam	SM, SC-SM, ML	A-4	0	0-5	87-100	70-100	56-95	38-69	16-33	2-13
	21-27	Gravelly fine sandy loam, gravelly sandy loam, loam	SM, SC-SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-100	13-46	16-33	2-13
	27-80	Weathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
MyB:												
Maymead---------	0-5	Loam, fine sandy loam	CL-ML, SM, ML	A-4, A-6	0	0-5	84-95	71-95	55-93	37-69	20-47	2-17
	5-80	Gravelly loam, cobbly loam, cobbly sandy loam	GM, SM, ML, CL	A-4	0	10-24	75-93	53-93	42-91	29-68	18-39	3-19
Northcove-------	0-3	Very cobbly loam	GC-GM, SC-SM, SM, GM	A-1-b, A-2-4, A-4	5-10	23-52	58-98	24-98	17-83	8-46	20-42	2-12
	3-60	Very cobbly sandy loam, very stony loam, very flaggy loam	SM, GC-GM, SC-SM, GM	A-1-b, A-2-4, A-4	13-34	22-50	54-100	15-100	11-85	5-47	16-31	2-12
	60-80	Very cobbly sandy loam, very stony loamy sand, extremely stony sand	GM, SC-SM, GC-GM	A-1-b, A-2-4	17-40	22-59	58-100	15-100	10-86	5-48	0-30	NP-12
NhC:												
Northcove-------	0-3	Very cobbly loam	SM, SC-SM, GM, GC-GM	A-1-b, A-2-4, A-4	5-10	23-52	58-98	24-98	17-83	8-46	20-42	2-12
	3-60	Very cobbly sandy loam, very stony loam, very flaggy loam	GM, SC-SM, SM, GC-GM	A-1-b, A-2-4, A-4	13-34	22-50	54-100	15-100	11-85	5-47	16-31	2-12
	60-80	Very cobbly sandy loam, very stony loamy sand, extremely stony sand	GC-GM, SC-SM, GM	A-1-b, A-2-4	17-40	22-59	58-100	15-100	10-86	5-48	0-30	NP-12
Maymead---------	0-5	Loam, fine sandy loam	ML, SM, CL-ML	A-4, A-6	0	0-5	84-95	71-95	55-93	37-69	20-47	2-17
	5-80	Gravelly loam, cobbly loam, cobbly sandy loam	CL, ML, GM, SM	A-4	0	10-24	75-93	53-93	42-91	29-68	18-39	3-19

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
NtD:												
Northcove-------	0-3	Very cobbly loam	GC-GM, GM, SC-SM, SM	A-1-b, A-2-4, A-4	5-10	23-52	58-98	24-98	17-83	8-46	20-42	2-12
	3-60	Very cobbly sandy loam, very stony loam, very flaggy loam	GC-GM, GM, SC-SM, SM	A-1-b, A-2-4, A-4	13-34	22-50	54-100	15-100	11-85	5-47	16-31	2-12
	60-80	Very cobbly sandy loam, very stony loamy sand, extremely stony sand	SC-SM, GM, GC-GM	A-1-b, A-2-4	17-40	22-59	58-100	15-100	10-86	5-48	0-30	NP-12
Maymead---------	0-5	Loam, fine sandy loam	SM, ML, CL-ML	A-6, A-4	0	0-5	84-95	71-95	55-93	37-69	20-47	2-17
	5-80	Gravelly loam, cobbly loam, cobbly sandy loam	CL, GM, ML, SM	A-4	0	10-24	75-93	53-93	42-91	29-68	18-39	3-19
NtE:												
Northcove-------	0-3	Very cobbly loam	GC-GM, SC-SM, SM, GM	A-1-b, A-2-4, A-4	5-10	23-52	58-98	24-98	17-83	8-46	20-42	2-12
	3-60	Very cobbly sandy loam, very stony loam, very flaggy loam	GC-GM, SC-SM, SM, GM	A-1-b, A-2-4, A-4	13-34	22-50	54-100	15-100	11-85	5-47	16-31	2-12
	60-80	Very cobbly sandy loam, very stony loamy sand, extremely stony sand	GC-GM, GM, SC-SM	A-1-b, A-2-4	17-40	22-59	58-100	15-100	10-86	5-48	0-30	NP-12
Maymead---------	0-5	Loam, fine sandy loam	SM, ML, CL-ML	A-4, A-6	0	0-5	84-95	71-95	55-93	37-69	20-47	2-17
	5-80	Gravelly loam, cobbly loam, cobbly sandy loam	CL, ML, SM, GM	A-4	0	10-24	75-93	53-93	42-91	29-68	18-39	3-19

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
OwC:												
Oconaluftee-----	0-12	Channery clay loam, channery loam	GM, ML, SM	A-5	0-6	6-17	73-95	36-95	28-95	19-70	42-81	5-19
	12-44	Channery loam, channery silt loam, channery fine sandy loam	ML, SM, CL, SC, GM	A-4, A-5	0-5	5-15	75-96	40-96	32-90	22-66	16-31	2-12
	44-80	Fine sandy loam, flaggy fine sandy loam, channery fine sandy loam	SM, CL, ML, SC-SM	A-4, A-5	0-5	5-14	89-100	77-100	63-95	42-68	16-30	2-12
Guyot-----------	0-11	Loam, clay loam	CL	A-4, A-6	0	0-19	77-100	77-100	64-100	51-86	23-38	9-15
	11-28	Fine sandy loam, loam	CL, ML	A-4	0	0-11	87-100	87-100	70-100	41-67	18-39	3-19
	28-54	Fine sandy loam, loam, sandy loam	SC-SM, SM	A-4	0	0-12	87-100	86-100	77-99	35-51	16-27	2-10
	54-80	Weathered bedrock			---	---	---	---	---	---	---	---
Cataloochee-----	0-9	Loam, channery loam, clay loam, channery clay loam	CL, ML	A-4, A-6	0	0-19	77-100	76-100	61-97	47-79	49-85	11-23
	9-19	Channery loam, loam	ML	A-5	0	8-22	72-91	71-90	60-85	44-65	24-37	9-17
	19-31	Channery sandy loam, channery fine sandy loam	SC-SM, SM	A-2-4, A-4	0	15-24	69-83	69-82	60-82	26-42	16-30	2-12
	31-80	Weathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
OwD:												
Oconaluftee-----	0-12	Channery clay loam, channery loam	SM, ML, GM	A-5	0-6	6-17	73-95	36-95	28-95	19-70	42-81	5-19
	12-44	Channery loam, channery silt loam, channery fine sandy loam	SC, GM, SM, ML, CL	A-4, A-5	0-5	5-15	75-96	40-96	32-90	22-66	16-31	2-12
	44-80	Fine sandy loam, flaggy fine sandy loam, channery fine sandy loam	SC-SM, ML, CL, SM	A-4, A-5	0-5	5-14	89-100	77-100	63-95	42-68	16-30	2-12
Guyot-----------	0-11	Loam, clay loam	CL	A-4, A-6	0	0-19	77-100	77-100	64-100	51-86	23-38	9-15
	11-28	Fine sandy loam, loam	ML, CL	A-4	0	0-11	87-100	87-100	70-100	41-67	18-39	3-19
	28-54	Fine sandy loam, loam, sandy loam	SC-SM, SM	A-4	0	0-12	87-100	86-100	77-99	35-51	16-27	2-10
	54-80	Weathered bedrock			---	---	---	---	---	---	---	---
Cataloochee-----	0-9	Loam, channery loam, clay loam, channery clay loam	ML, CL	A-4, A-6	0	0-19	77-100	76-100	61-97	47-79	49-85	11-23
	9-19	Channery loam, loam	ML	A-5	0	8-22	72-91	71-90	60-85	44-65	24-37	9-17
	19-31	Channery sandy loam, channery fine sandy loam	SC-SM, SM	A-2-4, A-4	0	15-24	69-83	69-82	60-82	26-42	16-30	2-12
	31-80	Weathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
OwE:												
Oconaluftee-----	0-12	Channery clay loam, channery loam	GM, ML, SM	A-5	0-6	6-17	73-95	36-95	28-95	19-70	42-81	5-19
	12-44	Channery loam, channery silt loam, channery fine sandy loam	SC, CL, GM, SM, ML	A-4, A-5	0-5	5-15	75-96	40-96	32-90	22-66	16-31	2-12
	44-80	Fine sandy loam, flaggy fine sandy loam, channery fine sandy loam	ML, CL, SM, SC-SM	A-4, A-5	0-5	5-14	89-100	77-100	63-95	42-68	16-30	2-12
Guyot-----------	0-11	Loam, clay loam	CL	A-4, A-6	0	0-19	77-100	77-100	64-100	51-86	23-38	9-15
	11-28	Fine sandy loam, loam	CL, ML	A-4	0	0-11	87-100	87-100	70-100	41-67	18-39	3-19
	28-54	Fine sandy loam, loam, sandy loam	SC-SM, SM	A-4	0	0-12	87-100	86-100	77-99	35-51	16-27	2-10
	54-80	Weathered bedrock			---	---	---	---	---	---	---	---
Cataloochee-----	0-9	Loam, channery loam, clay loam, channery clay loam	CL, ML	A-4, A-6	0	0-19	77-100	76-100	61-97	47-79	49-85	11-23
	9-19	Channery loam, loam	ML	A-5	0	8-22	72-91	71-90	60-85	44-65	24-37	9-17
	19-31	Channery sandy loam, channery fine sandy loam	SC-SM, SM	A-2-4, A-4	0	15-24	69-83	69-82	60-82	26-42	16-30	2-12
	31-80	Weathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
OwF:												
Oconaluftee-----	0-12	Channery clay loam, channery loam	SM, GM, ML	A-5	0-6	6-17	73-95	36-95	28-95	19-70	42-81	5-19
	12-44	Channery loam, channery silt loam, channery fine sandy loam	SC, CL, GM, ML, SM	A-4, A-5	0-5	5-15	75-96	40-96	32-90	22-66	16-31	2-12
	44-80	Fine sandy loam, flaggy fine sandy loam, channery fine sandy loam	ML, SC-SM, SM, CL	A-4, A-5	0-5	5-14	89-100	77-100	63-95	42-68	16-30	2-12
Guyot-----------	0-11	Loam, clay loam	CL	A-4, A-6	0	0-19	77-100	77-100	64-100	51-86	23-38	9-15
	11-28	Fine sandy loam, loam	ML, CL	A-4	0	0-11	87-100	87-100	70-100	41-67	18-39	3-19
	28-54	Fine sandy loam, loam, sandy loam	SM, SC-SM	A-4	0	0-12	87-100	86-100	77-99	35-51	16-27	2-10
	54-80	Weathered bedrock			---	---	---	---	---	---	---	---
Cataloochee-----	0-9	Loam, channery loam, clay loam, channery clay loam	ML, CL	A-4, A-6	0	0-19	77-100	76-100	61-97	47-79	49-85	11-23
	9-19	Channery loam, loam	ML	A-5	0	8-22	72-91	71-90	60-85	44-65	24-37	9-17
	19-31	Channery sandy loam, channery fine sandy loam	SC-SM, SM	A-2-4, A-4	0	15-24	69-83	69-82	60-82	26-42	16-30	2-12
	31-80	Weathered bedrock			---	---	---	---	---	---	---	---
PwC:												
Porters---------	0-9	Loam	ML	A-4	0	0-5	86-100	69-100	56-94	39-69	33-62	5-14
	9-54	Gravelly loam, loam, sandy loam	SC-SM, SM, CL-ML, ML	A-2, A-4	0-5	0-16	80-100	47-100	37-97	25-72	18-37	3-17
	54-80	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
PwC:												
Unaka-----------	0-9	Loam	CL-ML, SM, ML	A-4	0	0-5	92-98	72-98	59-92	41-68	33-62	5-14
	9-27	Gravelly loam, loam, sandy loam	SM, ML, CL-ML	A-4	0	0-17	86-96	63-96	49-93	34-70	18-37	3-17
	27-31	Weathered bedrock			---	---	---	---	---	---	---	---
	31-80	Unweathered bedrock			---	---	---	---	---	---	---	---
PwD:												
Porters---------	0-9	Loam	ML	A-4	0	0-5	86-100	69-100	56-94	39-69	33-62	5-14
	9-54	Gravelly loam, loam, sandy loam	SC-SM, SM, ML, CL-ML	A-2, A-4	0-5	0-16	80-100	47-100	37-97	25-72	18-37	3-17
	54-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Unaka-----------	0-9	Loam	CL-ML, ML, SM	A-4	0	0-5	92-98	72-98	59-92	41-68	33-62	5-14
	9-27	Gravelly loam, loam, sandy loam	SM, CL-ML, ML	A-4	0	0-17	86-96	63-96	49-93	34-70	18-37	3-17
	27-31	Weathered bedrock			---	---	---	---	---	---	---	---
	31-80	Unweathered bedrock			---	---	---	---	---	---	---	---
PwE:												
Porters---------	0-9	Loam	ML	A-4	0	0-5	86-100	69-100	56-94	39-69	33-62	5-14
	9-54	Gravelly loam, loam, sandy loam	SC-SM, SM, ML, CL-ML	A-2, A-4	0-5	0-16	80-100	47-100	37-97	25-72	18-37	3-17
	54-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Unaka-----------	0-9	Loam	ML, CL-ML, SM	A-4	0	0-5	92-98	72-98	59-92	41-68	33-62	5-14
	9-27	Gravelly loam, loam, sandy loam	SM, CL-ML, ML	A-4	0	0-17	86-96	63-96	49-93	34-70	18-37	3-17
	27-31	Weathered bedrock			---	---	---	---	---	---	---	---
	31-80	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
PxF:												
Porters---------	0-9	Loam	ML	A-4	0	0-5	86-100	69-100	56-94	39-69	33-62	5-14
	9-54	Gravelly loam, loam, sandy loam	SC-SM, ML, SM, CL-ML	A-2, A-4	0-5	0-16	80-100	47-100	37-97	25-72	18-37	3-17
	54-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Unaka-----------	0-9	Loam	ML, SM, CL-ML	A-4	0	0-5	92-98	72-98	59-92	41-68	33-62	5-14
	9-27	Gravelly loam, loam, sandy loam	SM, CL-ML, ML	A-4	0	0-17	86-96	63-96	49-93	34-70	18-37	3-17
	27-31	Weathered bedrock			---	---	---	---	---	---	---	---
	31-80	Unweathered bedrock			---	---	---	---	---	---	---	---
RbA:												
Reddies---------	0-14	Sandy loam, fine sandy loam, loam	SM	A-2-4, A-4	0	0-5	90-100	71-100	51-85	25-47	25-46	2-12
	14-26	Fine sandy loam, sandy loam, gravelly sandy loam	SM	A-1-b, A-2-4, A-4	0-1	0-16	75-100	40-100	34-98	15-49	16-31	2-12
	26-80	Extremely gravelly sand, very gravelly sand, very cobbly sand	SP-SM, GP-GM, GM, SM	A-1	0-5	10-50	13-75	10-55	4-40	1-15	8-12	NP
RcF:												
Rock outcrop.												
Cataska---------	0-6	Very channery loam, channery silt loam	CL-ML, GC-GM, GM, ML	A-4	0-2	10-30	45-80	45-75	40-70	40-60	0-30	NP-6
	6-16	Channery silt loam, channery loam, very channery silt loam	GC-GM, GM, GP-GM	A-1, A-2	0-2	10-25	15-50	10-45	10-40	10-35	0-30	NP-7
	16-28	Weathered bedrock			---	---	---	---	---	---	---	---
	28-80	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
RhD:												
Rock outcrop.												
Chestoa---------	0-13	Sandy loam	SC-SM, SM	A-2-4, A-4	0	0	86-100	64-100	46-82	23-45	33-61	5-13
	13-26	Channery sandy loam, channery loamy sand, loam	CL-ML, ML	A-4	0	0	100	100	70-85	32-47	16-33	2-13
	26-80	Unweathered bedrock			---	---	---	---	---	---	---	---
RhF:												
Rock outcrop.												
Chestoa---------	0-13	Sandy loam	SC-SM, SM	A-2-4, A-4	0	0	86-100	64-100	46-82	23-45	33-61	5-13
	13-26	Channery sandy loam, channery loamy sand, loam	ML, CL-ML	A-4	0	0	100	100	70-85	32-47	16-33	2-13
	26-80	Unweathered bedrock			---	---	---	---	---	---	---	---
RkF:												
Rock outcrop.												
Cleveland-------	0-5	Sandy loam	SC-SM, SM	A-2, A-4, A-2-4	0	0-5	82-100	63-100	44-84	20-46	21-43	3-13
	5-14	Sandy loam	SC-SM, SM	A-2, A-4, A-2-4	0	0-5	82-100	63-100	44-84	20-46	17-33	3-13
	14-80	Unweathered bedrock			---	---	---	---	---	---	---	---
RoF:												
Rock outcrop.												
Oteen-----------	0-2	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	2-11	Fine sandy loam, sandy loam, loam	SM, SC-SM	A-2-4, A-4	0	0-5	87-100	70-100	59-100	22-46	16-33	2-13
	11-15	Very gravelly sandy loam, gravelly fine sandy loam, gravelly loam	SM, SC-SM, GM	A-1-b, A-2-4, A-4	0-1	0-9	72-97	36-97	25-81	11-44	16-32	2-13
	15-80	Weathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
RpF:												
Rock outcrop.												
Unicoi----------	0-5	Cobbly sandy loam, cobbly loam	SM, SC-SM	A-2-4, A-2	0-5	5-22	73-90	51-90	44-90	28-62	20-43	2-13
	5-16	Very cobbly loam, very cobbly sandy loam, very stony loam	GC-GM, GM, SC-SM, SM	A-2-4, A-2	0	17-40	68-87	39-87	34-87	21-60	16-33	2-13
	16-80	Unweathered bedrock			---	---	---	---	---	---	---	---
RsA:												
Rosman----------	0-10	Fine sandy loam	SM, SC-SM, ML	A-2-4, A-2-5, A-4	0	0	95-100	84-100	73-98	31-47	27-46	4-12
	10-59	Fine sandy loam, sandy loam, loam	SM, SC-SM, ML	A-2-4, A-4	0	0	95-100	84-100	71-99	33-54	15-31	1-12
	59-80	Fine sandy loam, sandy loam, loam	ML, SC-SM, SM	A-2-4, A-4	0	0	95-100	84-100	71-99	33-54	15-31	1-12
SoD:												
Soco------------	0-2	Fine sandy loam, loam, silt loam	ML, CL	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	2-33	Fine sandy loam, loam, silt loam	ML, CL	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	33-80	Weathered bedrock			---	---	---	---	---	---	---	---
Stecoah---------	0-5	Fine sandy loam, loam, silt loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	5-47	Sandy loam, loam, fine sandy loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	47-80	Weathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
SoE:												
Soco------------	0-2	Fine sandy loam, loam, silt loam	ML, CL	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	2-33	Fine sandy loam, loam, silt loam	ML, CL	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	33-80	Weathered bedrock			---	---	---	---	---	---	---	---
Stecoah---------	0-5	Fine sandy loam, loam, silt loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	5-47	Sandy loam, fine sandy loam, loam	ML, CL	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	47-80	Weathered bedrock			---	---	---	---	---	---	---	---
SoF:												
Soco------------	0-2	Fine sandy loam, loam, silt loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	2-33	Fine sandy loam, loam, silt loam	ML, CL	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	33-80	Weathered bedrock			---	---	---	---	---	---	---	---
Stecoah---------	0-5	Fine sandy loam, loam, silt loam	ML, CL	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	5-47	Sandy loam, fine sandy loam, loam	ML, CL	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	47-80	Weathered bedrock			---	---	---	---	---	---	---	---
StB:												
Statler---------	0-10	Fine sandy loam, sandy loam	ML, CL	A-4, A-6	0	0	95-100	72-100	62-100	25-52	29-58	5-18
	10-50	Clay loam, silt loam, loam	CL	A-6	0	0	95-100	72-100	57-96	43-76	27-45	12-25
	50-80	Sandy clay loam, clay loam, loam	CL	A-4, A-6, A-7	0	0-5	95-100	72-100	58-100	40-76	24-44	9-25

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
SwD:												
Sylco-----------	0-6	Very channery loam, channery silt loam	GC, SC, GC-GM	A-4, A-1-b, A-2-4	0-14	22-41	51-72	50-71	42-67	30-50	29-47	9-17
	6-22	Very channery silt loam, flaggy loam, very channery silty clay loam	GC, CL-ML, CL, GC-GM	A-1-b, A-2-4, A-4	5-18	15-42	48-85	47-85	40-85	35-80	26-45	9-25
	22-30	Very channery silt loam, very flaggy loam, very flaggy silty clay loam	GC, GC-GM, SC, SC-SM	A-2-4, A-2, A-4	12-30	21-51	35-83	34-83	29-83	25-78	26-45	9-25
	30-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Cataska---------	0-6	Very channery loam, very channery silt loam, channery silt loam	GM, ML, GC-GM, CL-ML	A-2-4	5-16	17-37	59-85	58-84	48-78	34-58	26-45	7-15
	6-16	Very channery silt loam, very channery loam, channery silt loam	GP-GM, GM, GC-GM	A-1-b, A-2	9-18	28-44	41-69	40-68	35-66	29-55	22-34	7-15
	16-28	Weathered bedrock			---	---	---	---	---	---	---	---
	28-80	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
SwE:												
Sylco-----------	0-6	Very channery loam, channery silt loam	GC, SC, GC-GM	A-4, A-1-b, A-2-4	0-14	22-41	51-72	50-71	42-67	30-50	29-47	9-17
	6-22	Very channery silt loam, flaggy loam, very channery silty clay loam	GC-GM, GC, CL-ML, CL	A-1-b, A-2-4, A-4	5-18	15-42	48-85	47-85	40-85	35-80	26-45	9-25
	22-30	Very channery silt loam, very flaggy loam, very flaggy silty clay loam	SC, SC-SM, GC-GM, GC	A-2-4, A-2, A-4	12-30	21-51	35-83	34-83	29-83	25-78	26-45	9-25
	30-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Cataska---------	0-6	Very channery loam, very channery silt loam	CL-ML, ML, GM, GC-GM	A-2-4	5-16	17-37	59-85	58-84	48-78	34-58	26-45	7-15
	6-16	Very channery silt loam, very channery loam, channery silt loam	GP-GM, GM, GC-GM	A-1-b, A-2	9-18	28-44	41-69	40-68	35-66	29-55	22-34	7-15
	16-28	Weathered bedrock			---	---	---	---	---	---	---	---
	28-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop.												
SyD:												
Sylco-----------	0-5	Channery loam	ML, SM, GM, MH	A-4, A-5, A-7-5	0-5	5-15	70-95	55-90	40-80	36-65	30-64	NP-11
	5-23	Very channery loam	GC, GC-GM, SC-SM, CL	A-2-4, A-4	0-5	5-15	66-87	26-87	21-87	15-68	24-45	9-25
	23-80	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
SyD:												
Soco------------	0-5	Channery fine sandy loam, channery loam	GM, SM, ML, MH	A-4, A-5	4-18	4-28	68-98	67-98	55-93	37-67	20-42	2-12
	5-24	Fine sandy loam, loam, silt loam	ML, SC, SM, CL	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	24-35	Channery fine sandy loam, channery loam, channery silt loam	SM, SC, ML, CL	A-4, A-6	4-17	4-27	69-98	68-98	56-93	37-67	16-30	2-12
	35-80	Weathered bedrock			---	---	---	---	---	---	---	---
SyE:												
Sylco-----------	0-5	Channery loam	GM, MH, SM, ML	A-4, A-5, A-7-5	0-5	5-15	70-95	55-90	40-80	36-65	30-64	NP-11
	5-23	Very channery loam	SC-SM, CL, GC, GC-GM	A-2-4, A-4	0-5	5-15	66-87	26-87	21-87	15-68	24-45	9-25
	23-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Soco------------	0-5	Channery fine sandy loam, channery loam	ML, SM, GM, MH	A-4, A-5	4-18	4-28	68-98	67-98	55-93	37-67	20-42	2-12
	5-24	Fine sandy loam, loam, silt loam	SM, ML, SC, CL	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	24-35	Channery fine sandy loam, channery loam, channery silt loam	CL, SM, SC, ML	A-4, A-6	4-17	4-27	69-98	68-98	56-93	37-67	16-31	2-12
	35-80	Weathered bedrock			---	---	---	---	---	---	---	---
SzF:												
Sylco-----------	0-5	Channery loam	SM, ML, GM, MH	A-4, A-5, A-7-5	0-5	5-15	70-95	55-90	40-80	36-65	30-64	NP-11
	5-23	Very channery loam	CL, GC, GC-GM, SC-SM	A-2-4, A-4	0-5	5-15	66-87	26-87	21-87	15-68	24-45	9-25
	23-80	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
SzF:												
Soco------------	0-5	Channery fine sandy loam, channery loam	SM, GM, ML, MH	A-4, A-5	4-18	4-28	68-98	67-98	55-93	37-67	20-42	2-12
	5-24	Fine sandy loam, loam, silt loam	SM, CL, ML, SC	A-4, A-6	0-4	1-11	91-98	90-98	74-93	50-67	16-31	2-12
	24-35	Channery fine sandy loam, channery loam, channery silt loam	SC, ML, SM, CL	A-4, A-6	4-17	4-27	69-98	68-98	56-93	37-67	16-31	2-12
	35-80	Weathered bedrock			---	---	---	---	---	---	---	---
TaB:												
Tate------------	0-7	Loam, fine sandy loam	CL-ML, SM, ML	A-4, A-6	0	0-5	84-95	71-95	55-93	37-69	20-47	2-17
	7-46	Clay loam, sandy clay loam, loam	SC-SM, CL	A-6	0-5	0-14	94-100	80-100	67-98	50-78	29-45	13-25
	46-80	Gravelly loam, cobbly loam, cobbly sandy loam	SM, ML, GM, CL	A-4	0	10-24	75-93	53-93	42-91	29-68	18-39	3-19
TaC:												
Tate------------	0-7	Loam, fine sandy loam	ML, SM, CL-ML	A-4, A-6	0	0-5	84-95	71-95	55-93	37-69	20-47	2-17
	7-46	Clay loam, sandy clay loam, loam	SC-SM, CL	A-6	0-5	0-14	94-100	80-100	67-98	50-78	29-45	13-25
	46-80	Gravelly loam, cobbly loam, cobbly sandy loam	ML, GM, CL, SM	A-4	0	10-24	75-93	53-93	42-91	29-68	18-39	3-19
TaD:												
Tate------------	0-7	Loam, fine sandy loam	ML, SM, CL-ML	A-4, A-6	0	0-5	84-95	71-95	55-93	37-69	20-47	2-17
	7-46	Clay loam, sandy clay loam, loam	CL, SC-SM	A-6	0-5	0-14	94-100	80-100	67-98	50-78	29-45	13-25
	46-80	Gravelly loam, cobbly loam, cobbly sandy loam	SM, ML, GM, CL	A-4	0	10-24	75-93	53-93	42-91	29-68	18-39	3-19

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
TkC:												
Tate------------	0-7	Loam, fine sandy loam	SM, CL-ML, ML	A-4, A-6	0	0-5	84-95	71-95	55-93	37-69	20-47	2-17
	7-46	Gravelly sandy clay loam, gravelly sandy loam, clay loam	SM, SC, ML, CL	A-2, A-4, A-6, A-7	0-1	0-13	71-92	37-76	29-72	16-45	27-45	12-25
	46-80	Gravelly loam, cobbly loam, cobbly sandy loam	CL, GM, ML, SM	A-4	0	10-24	75-93	53-93	42-91	29-68	18-39	3-19
TkD:												
Tate------------	0-7	Loam, fine sandy loam	CL-ML, SM, ML	A-4, A-6	0	0-5	84-95	71-95	55-93	37-69	20-47	2-17
	7-46	Gravelly sandy clay loam, gravelly sandy loam, clay loam	SM, CL, ML, SC	A-2, A-4, A-6, A-7	0-1	0-13	71-92	37-76	29-72	16-45	27-45	12-25
	46-80	Gravelly loam, cobbly loam, cobbly sandy loam	GM, SM, ML, CL	A-4	0	10-24	75-93	53-93	42-91	29-68	18-39	3-19
TmC:												
Tate------------	0-7	Loam, fine sandy loam	SM, ML, CL-ML	A-4, A-6	0	0-5	84-95	71-95	55-93	37-69	20-47	2-17
	7-46	Clay loam, sandy clay loam, loam	ML, CL-ML, CL, SC-SM	A-6	0-5	0-14	94-100	80-100	67-98	50-78	29-45	13-25
	46-80	Fine sandy loam, gravelly fine sandy loam, cobbly fine sandy loam	GM, SC-SM, SM, GC-GM	A-2-4, A-2-6, A-4	0-8	0-30	84-100	69-100	57-98	21-46	16-32	2-13
Urban land.												

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
ToD:												
Toecane---------	0-8	Very cobbly loam	SM, SC-SM	A-2-4, A-4	5-22	32-50	67-98	26-98	21-95	14-71	38-77	2-16
	8-24	Very cobbly sandy clay loam, very cobbly loam, very cobbly fine sandy loam	SM, GC-GM, GM, SC-SM	A-1-b, A-2-4, A-4	5-20	30-48	67-98	28-98	22-96	14-69	20-41	6-21
	24-30	Very cobbly sandy loam, very cobbly fine sandy loam, extremely cobbly loamy fine sand	SC-SM, GC-GM, SM, GM	A-1-b, A-2-4, A-4	5-20	30-48	67-98	28-98	19-82	8-45	16-32	2-13
	30-80	Extremely cobbly loamy sand, extremely cobbly loamy fine sand, very stony sandy loam	SM, SC-SM, GM, GC-GM	A-1-b, A-2-4	5-23	33-76	55-81	10-61	8-55	2-18	12-25	NP-7

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
ToE:												
Toecane---------	0-8	Very cobbly loam	SC-SM, SM	A-2-4, A-4	5-22	32-50	67-98	26-98	21-95	14-71	38-77	2-16
	8-24	Very cobbly sandy clay loam, very cobbly loam, very cobbly fine sandy loam	GC-GM, SM, GM, SC-SM	A-1-b, A-2-4, A-4	5-20	30-48	67-98	28-98	22-96	14-69	20-41	6-21
	24-30	Very cobbly sandy loam, very cobbly fine sandy loam, extremely cobbly loamy fine sand	SM, SC-SM, GM, GC-GM	A-1-b, A-2-4, A-4	5-20	30-48	67-98	28-98	19-82	8-45	16-33	2-13
	30-80	Extremely cobbly loamy sand, extremely cobbly loamy fine sand, very stony sandy loam	SM, GM, GC-GM, SC-SM	A-1-b, A-2-4	5-23	33-76	55-81	10-61	8-55	2-18	12-25	NP-7

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
TrC:												
Toecane---------	0-8	Cobbly loam	SC-SM, SM	A-2-4, A-4	1-10	22-32	76-98	52-98	42-96	29-72	40-77	3-16
	8-24	Very cobbly sandy clay loam, very cobbly loam, very cobbly fine sandy loam	SM, SC-SM, GM, GC-GM	A-1-b, A-2-4, A-4	5-20	30-48	67-98	28-98	22-96	14-69	20-41	6-21
	24-30	Very cobbly sandy loam, very cobbly fine sandy loam, extremely cobbly loamy fine sand	SM, SC-SM, GC-GM, GM	A-1-b, A-2-4, A-4	5-20	30-48	67-98	28-98	19-82	8-45	16-33	2-13
	30-80	Extremely cobbly loamy sand, extremely cobbly loamy fine sand, very stony sandy loam	GM, GC-GM, SM, SC-SM	A-1-b, A-2-4	5-23	33-76	55-81	10-61	8-55	2-18	12-25	NP-7
Tusquitee-------	0-8	Gravelly loam	SC-SM, SM	A-1-b, A-2-4, A-4	0-2	5-15	73-86	51-86	41-82	28-60	38-73	2-12
	8-48	Loam, gravelly loam, sandy loam	SM, SC-SM, ML	A-4	0-1	0-16	90-100	58-100	47-94	32-69	18-33	3-13
	48-80	Gravelly fine sandy loam, gravelly sandy loam, cobbly fine sandy loam	GC-GM, GM, SM, SC-SM	A-2-4, A-2, A-4	0-12	5-21	59-98	16-98	14-98	6-48	16-32	2-13

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
TsD:												
Toecane---------	0-8	Cobbly loam	SM, SC-SM	A-2-4, A-4	1-10	22-32	76-98	52-98	42-96	29-72	40-77	3-16
	8-24	Very cobbly sandy clay loam, very cobbly loam, very cobbly fine sandy loam	GM, GC-GM, SC-SM, SM	A-1-b, A-2-4, A-4	5-20	30-48	67-98	28-98	22-96	14-69	20-41	6-21
	24-30	Very cobbly sandy loam, very cobbly fine sandy loam, extremely cobbly loamy fine sand	GC-GM, SM, GM, SC-SM	A-1-b, A-2-4, A-4	5-20	30-48	67-98	28-98	19-82	8-45	16-32	2-13
	30-80	Extremely cobbly loamy sand, extremely cobbly loamy fine sand, very stony sandy loam	GM, SM, SC-SM, GC-GM	A-1-b, A-2-4	5-23	33-76	55-81	10-61	8-55	2-18	12-25	NP-7
Tusquitee-------	0-8	Gravelly loam	SM, SC-SM	A-1-b, A-2-4, A-4	0-2	5-15	73-86	51-86	41-82	28-60	38-73	2-12
	8-48	Loam, gravelly loam, sandy loam	SM, SC-SM, ML	A-4	0-1	0-16	90-100	58-100	47-94	32-69	18-33	3-13
	48-80	Gravelly fine sandy loam, gravelly sandy loam, cobbly fine sandy loam	SC-SM, GC-GM, GM, SM	A-2-4, A-2, A-4	0-12	5-21	59-98	16-98	14-98	6-48	16-32	2-13

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
TsE:												
Toecane---------	0-8	Cobbly loam	SM, SC-SM	A-2-4, A-4	1-10	22-32	76-98	52-98	42-96	29-72	40-77	3-16
	8-24	Very cobbly sandy clay loam, very cobbly loam, very cobbly fine sandy loam	SC-SM, SM, GC-GM, GM	A-1-b, A-2-4, A-4	5-20	30-48	67-98	28-98	22-96	14-69	20-41	6-21
	24-30	Very cobbly sandy loam, very cobbly fine sandy loam, extremely cobbly loamy fine sand	GM, GC-GM, SC-SM, SM	A-1-b, A-2-4, A-4	5-20	30-48	67-98	28-98	19-82	8-45	16-32	2-13
	30-80	Extremely cobbly loamy sand, extremely cobbly loamy fine sand, very stony sandy loam	GC-GM, GM, SM, SC-SM	A-1-b, A-2-4	5-23	33-76	55-81	10-61	8-55	2-18	12-25	NP-7
Tusquitee-------	0-8	Gravelly loam	SM, SC-SM	A-1-b, A-2-4, A-4	0-2	5-15	73-86	51-86	41-82	28-60	38-73	2-12
	8-48	Loam, gravelly loam, sandy loam	SC-SM, SM, ML	A-4	0-1	0-16	90-100	58-100	47-94	32-69	18-33	3-13
	48-80	Gravelly fine sandy loam, gravelly sandy loam, cobbly fine sandy loam	GC-GM, GM, SC-SM, SM	A-2-4, A-2, A-4	0-12	5-21	59-98	16-98	14-98	6-48	16-32	2-13

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
TuD:												
Tusquitee-------	0-8	Gravelly loam	SC-SM, SM	A-1-b, A-2-4, A-4	0-2	5-15	73-86	51-86	41-82	28-60	38-73	2-12
	8-48	Loam, gravelly loam, sandy loam	SM, SC-SM, ML	A-4	0-1	0-16	90-100	58-100	47-94	32-69	18-33	3-13
	48-80	Gravelly fine sandy loam, gravelly sandy loam, cobbly fine sandy loam	SM, GM, SC-SM, GC-GM	A-2-4, A-2, A-4	0-12	5-21	59-98	16-98	14-98	6-48	16-32	2-13
Toecane---------	0-8	Cobbly loam	SC-SM, SM	A-2-4, A-4	1-10	22-32	76-98	52-98	42-96	29-72	40-77	3-16
	8-24	Very cobbly sandy clay loam, very cobbly loam, very cobbly fine sandy loam	GM, SC-SM, SM, GC-GM	A-1-b, A-2-4, A-4	5-20	30-48	67-98	28-98	22-96	14-69	20-41	6-21
	24-30	Very cobbly sandy loam, very cobbly fine sandy loam, extremely cobbly loamy fine sand	GM, GC-GM, SC-SM, SM	A-1-b, A-2-4, A-4	5-20	30-48	67-98	28-98	19-82	8-45	16-33	2-13
	30-80	Extremely cobbly loamy sand, extremely cobbly loamy fine sand, very stony sandy loam	GC-GM, GM, SC-SM, SM	A-1-b, A-2-4	5-23	33-76	55-81	10-61	8-55	2-18	12-25	NP-7

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
TwB:												
Tusquitee-------	0-8	Loam, fine sandy loam	SM, ML	A-2, A-4	0	0-5	83-100	75-100	54-100	22-50	20-43	2-13
	8-48	Loam, gravelly loam, sandy loam	SM, SC-SM, ML	A-4	0-1	0-16	90-100	58-100	47-94	32-69	18-33	3-13
	48-80	Gravelly fine sandy loam, gravelly sandy loam, cobbly fine sandy loam	SC-SM, GM, GC-GM, SM	A-2-4, A-2, A-4	0-12	5-21	59-98	16-98	14-98	6-48	16-32	2-13
Whiteside-------	0-11	Loam	ML, SM	A-2, A-4, A-5	0	0-5	90-100	70-100	53-89	29-54	25-50	2-11
	11-37	Loam, sandy clay loam	ML, SM, SC-SM	A-2, A-4, A-5, A-6	0	0-5	90-100	71-100	57-89	33-55	27-39	12-19
	37-80	Fine sandy loam, sandy clay loam, sandy loam	ML, SC-SM, SM	A-2-4, A-4	0	0-5	90-100	72-100	61-100	28-66	18-44	4-25
TwC:												
Tusquitee-------	0-8	Loam, fine sandy loam	ML, SM	A-2, A-4	0	0-5	83-100	75-100	54-100	22-50	20-43	2-13
	8-48	Loam, gravelly loam, sandy loam	ML, SC-SM, SM	A-4	0-1	0-16	90-100	58-100	47-94	32-69	18-33	3-13
	48-80	Gravelly fine sandy loam, gravelly sandy loam, cobbly fine sandy loam	GM, SM, SC-SM, GC-GM	A-2-4, A-2, A-4	0-12	5-21	59-98	16-98	14-98	6-48	16-32	2-13
Whiteside-------	0-11	Loam	SM, ML	A-2, A-4, A-5	0	0-5	90-100	70-100	53-89	29-54	25-50	2-11
	11-37	Loam, sandy clay loam	SM, SC-SM, ML	A-2, A-4, A-5, A-6	0	0-5	90-100	71-100	57-89	33-55	27-39	12-19
	37-80	Fine sandy loam, sandy clay loam, sandy loam	SC-SM, ML, SM	A-2-4, A-4	0	0-5	90-100	72-100	61-100	28-66	18-44	4-25
UcB:												
Udifluvents-----	0-80	Loamy sand, sand, fine sand	SM, SP-SM	A-2-4, A-3	0	0-7	95-100	81-100	64-83	19-28	6-14	NP

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
Ud:												
Udorthents------	0-80	Sandy clay loam, sandy loam, clay loam	CL-ML, SC-SM, SC, CL	A-2, A-4, A-6, A-7	0	0-3	95-100	84-100	59-100	26-66	20-57	6-36
UfB:												
Udorthents------	0-80	Sandy loam	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6, A-7	0	0-3	95-100	84-100	51-97	20-60	20-57	6-36
Urban land.												
UhE:												
Udorthents------	0-80	Sandy loam	SC-SM, CL, SC, CL-ML	A-2, A-4, A-6, A-7	0	0-3	95-100	84-100	51-97	20-60	20-57	6-36
Urban land.												
UkE:												
Unaka-----------	0-9	Loam	SM, ML, CL-ML	A-4	0	0-5	92-98	72-98	59-92	41-68	33-62	5-14
	9-27	Gravelly loam, loam, sandy loam	ML, SM, CL-ML	A-4	0	0-17	86-96	63-96	49-93	34-70	18-37	3-17
	27-31	Weathered bedrock			---	---	---	---	---	---	---	---
	31-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop.												
UkF:												
Unaka-----------	0-9	Loam	SM, CL-ML, ML	A-4	0	0-5	92-98	72-98	59-92	41-68	33-62	5-14
	9-27	Gravelly loam, loam, sandy loam	CL-ML, ML, SM	A-4	0	0-17	86-96	63-96	49-93	34-70	18-37	3-17
	27-31	Weathered bedrock			---	---	---	---	---	---	---	---
	31-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop.												

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
UrD:												
Unicoi----------	0-5	Cobbly sandy loam, cobbly loam	SM, SC-SM	A-2-4, A-2	0-5	5-22	73-90	51-90	44-90	28-62	20-43	2-13
	5-16	Very cobbly loam, very cobbly sandy loam, very stony loam	GM, SC-SM, SM, GC-GM	A-2-4, A-2	0	17-40	68-87	39-87	34-87	21-60	16-33	2-13
	16-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop.												
UsB:												
Unison----------	0-10	Loam, fine sandy loam	CL-ML, CL, ML	A-4, A-6	0	0-11	90-100	79-100	64-96	45-71	25-47	6-17
	10-49	Clay, clay loam, sandy clay loam	CL, CH	A-6, A-7	0	0-12	89-100	79-100	57-100	48-100	39-77	21-51
	49-80	Very gravelly clay loam, gravelly sandy clay loam, gravelly clay loam	SM, GM, SC-SM	A-1-b, A-2-4, A-4	0-1	0-9	72-97	36-97	25-81	11-44	16-32	2-13
UsC:												
Unison----------	0-10	Loam, fine sandy loam	ML, CL-ML, CL	A-4, A-6	0	0-11	90-100	79-100	64-96	45-71	25-47	6-17
	10-49	Clay, clay loam, sandy clay loam	CL, CH	A-6, A-7	0	0-12	89-100	79-100	57-100	48-100	39-77	21-51
	49-80	Very gravelly clay loam, gravelly sandy clay loam, gravelly clay loam	SM, SC-SM, GM	A-1-b, A-2-4, A-4	0-1	0-9	72-97	36-97	25-81	11-44	16-32	2-13

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
UsD:												
Unison----------	0-10	Loam, fine sandy loam	CL-ML, CL, ML	A-4, A-6	0	0-11	90-100	79-100	64-96	45-71	25-47	6-17
	10-49	Clay, clay loam, sandy clay loam	CH, CL	A-6, A-7	0	0-12	89-100	79-100	57-100	48-100	39-77	21-51
	49-80	Very gravelly clay loam, gravelly sandy clay loam, gravelly clay loam	SM, SC-SM, GM	A-1-b, A-2-4, A-4	0-1	0-9	72-97	36-97	25-81	11-44	16-32	2-13
W.												
Water												
WaC2:												
Walnut----------	0-2	Fine sandy loam	CL-ML, SC-SM, ML, SM	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	2-21	Loam, fine sandy loam, sandy loam	SM, SC-SM, ML	A-4	0	0-5	87-100	70-100	56-95	38-69	16-33	2-13
	21-27	Gravelly fine sandy loam, gravelly sandy loam, loam	SM, SC-SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-100	13-46	16-33	2-13
	27-80	Weathered bedrock			---	---	---	---	---	---	---	---
Oteen-----------	0-2	Fine sandy loam	SM, SC-SM, ML, CL-ML	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	2-11	Fine sandy loam, sandy loam, loam	SC-SM, SM	A-2-4, A-4	0	0-5	87-100	70-100	59-100	22-46	16-33	2-13
	11-15	Very gravelly sandy loam, gravelly fine sandy loam, gravelly loam	SM, SC-SM, GM	A-1-b, A-2-4, A-4	0-1	0-9	72-97	36-97	25-81	11-44	16-32	2-13
	15-80	Weathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
WaC2:												
Mars Hill-------	0-3	Fine sandy loam	CL-ML, SM, SC-SM, ML	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	3-35	Fine sandy loam, loam, sandy loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	57-97	37-68	16-33	2-13
	35-46	Fine sandy loam, sandy loam, gravelly sandy loam	SM, SC-SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-100	13-46	16-32	2-13
	46-80	Weathered bedrock			---	---	---	---	---	---	---	---
WaD2:												
Walnut----------	0-2	Fine sandy loam	SM, SC-SM, ML, CL-ML	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	2-21	Loam, fine sandy loam, sandy loam	SM, SC-SM, ML	A-4	0	0-5	87-100	70-100	56-95	38-69	16-33	2-13
	21-27	Gravelly fine sandy loam, gravelly sandy loam, loam	SM, SC-SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-100	13-46	16-33	2-13
	27-80	Weathered bedrock			---	---	---	---	---	---	---	---
Oteen-----------	0-2	Fine sandy loam	CL-ML, ML, SM, SC-SM	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	2-11	Fine sandy loam, sandy loam, loam	SC-SM, SM	A-2-4, A-4	0	0-5	87-100	70-100	59-100	22-46	16-33	2-13
	11-15	Very gravelly sandy loam, gravelly fine sandy loam, gravelly loam	SM, SC-SM, GM	A-1-b, A-2-4, A-4	0-1	0-9	72-97	36-97	25-81	11-44	16-32	2-13
	15-80	Weathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
WaD2: Mars Hill-------	0-3	Fine sandy loam	SM, CL-ML, ML, SC-SM	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	3-35	Fine sandy loam, loam, sandy loam	SM, SC-SM, ML	A-4	0	0-5	87-100	70-100	57-97	37-68	16-33	2-13
	35-46	Fine sandy loam, sandy loam, gravelly sandy loam	SM, SC-SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-100	13-46	16-32	2-13
	46-80	Weathered bedrock			---	---	---	---	---	---	---	---
WaE2: Walnut----------	0-2	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	2-21	Loam, fine sandy loam, sandy loam	SM, SC-SM, ML	A-4	0	0-5	87-100	70-100	56-95	38-69	16-33	2-13
	21-27	Gravelly fine sandy loam, gravelly sandy loam, loam	SC-SM, SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-100	13-46	16-33	2-13
	27-80	Weathered bedrock			---	---	---	---	---	---	---	---
Oteen-----------	0-2	Fine sandy loam	ML, CL-ML, SM, SC-SM	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	2-11	Fine sandy loam, sandy loam, loam	SM, SC-SM	A-2-4, A-4	0	0-5	87-100	70-100	59-100	22-46	16-33	2-13
	11-15	Very gravelly sandy loam, gravelly fine sandy loam, gravelly loam	GM, SC-SM, SM	A-1-b, A-2-4, A-4	0-1	0-9	72-97	36-97	25-81	11-44	16-32	2-13
	15-80	Weathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
WaE2:												
Mars Hill-------	0-3	Fine sandy loam	CL-ML, SM, SC-SM, ML	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	3-35	Fine sandy loam, loam, sandy loam	SM, SC-SM, ML	A-4	0	0-5	87-100	70-100	57-97	37-68	16-33	2-13
	35-46	Fine sandy loam, sandy loam, gravelly sandy loam	SM, SC-SM	A-4, A-2-4	0-1	0-9	73-100	41-100	35-100	13-46	16-32	2-13
	46-80	Weathered bedrock			---	---	---	---	---	---	---	---
WoF:												
Walnut----------	0-3	Fine sandy loam	ML, CL-ML, SC-SM, SM	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	3-9	Fine sandy loam, loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	56-95	38-69	16-32	2-13
	9-21	Loam, fine sandy loam, sandy loam	SC-SM, SM, ML	A-4	0	0-5	87-100	70-100	56-95	38-69	16-33	2-13
	21-27	Gravelly fine sandy loam, gravelly sandy loam, loam	SC-SM, SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-100	13-46	16-33	2-13
	27-80	Weathered bedrock			---	---	---	---	---	---	---	---
Oteen-----------	0-2	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0-2	0-5	85-100	80-95	60-80	30-55	15-30	NP-7
	2-11	Fine sandy loam, sandy loam, loam	SC-SM, SM	A-2-4, A-4	0	0-5	87-100	70-100	59-100	22-46	16-33	2-13
	11-15	Very gravelly sandy loam, gravelly fine sandy loam, gravelly loam	GM, SC-SM, SM	A-1-b, A-2-4, A-4	0-1	0-9	72-97	36-97	25-81	11-44	16-32	2-13
	15-80	Weathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop.												

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
WrC:												
Wayah----------	0-14	Loam	SM, ML	A-2, A-4, A-5	0-2	0-6	88-100	66-100	53-96	37-71	42-77	5-16
	14-48	Sandy loam, fine sandy loam, gravelly sandy loam	SC-SM, GM, SM, ML	A-1-b, A-2-4, A-4	0-1	0-12	89-100	70-100	48-84	22-46	20-37	6-17
	48-80	Gravelly sandy loam, gravelly fine sandy loam, gravelly loamy sand	GM, SM	A-1-b, A-2-4	0-5	3-14	63-90	35-90	25-75	11-41	0-27	NP-10
Burton----------	0-15	Sandy clay loam	SM	A-2-4, A-4, A-5	0-8	0-10	81-100	63-100	45-85	22-47	38-72	2-11
	15-24	Sandy loam, loam, gravelly sandy loam	SC-SM, SM	A-2, A-4, A-2-4	0	0-16	76-100	53-100	38-85	18-47	16-31	2-12
	24-27	Weathered bedrock			---	---	---	---	---	---	---	---
	27-80	Unweathered bedrock			---	---	---	---	---	---	---	---
WrD:												
Wayah----------	0-14	Loam	ML, SM	A-2, A-4, A-5	0-2	0-6	88-100	66-100	53-96	37-71	42-77	5-16
	14-48	Sandy loam, fine sandy loam, gravelly sandy loam	ML, SC-SM, SM, GM	A-1-b, A-2-4, A-4	0-1	0-12	89-100	70-100	48-84	22-46	20-37	6-17
	48-80	Gravelly sandy loam, gravelly fine sandy loam, gravelly loamy sand	GM, SM	A-1-b, A-2-4	0-5	3-14	63-90	35-90	25-75	11-41	0-27	NP-10
Burton----------	0-15	Sandy clay loam	SM	A-2-4, A-4, A-5	0-8	0-10	81-100	63-100	45-85	22-47	38-72	2-11
	15-24	Sandy loam, loam, gravelly sandy loam	SM, SC-SM	A-2, A-4, A-2-4	0	0-16	76-100	53-100	38-85	18-47	16-31	2-12
	24-27	Weathered bedrock			---	---	---	---	---	---	---	---
	27-80	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
WrE:												
Wayah-----------	0-14	Loam	ML, SM	A-2, A-4, A-5	0-2	0-6	88-100	66-100	53-96	37-71	42-77	5-16
	14-48	Sandy loam, fine sandy loam, gravelly sandy loam	GM, ML, SC-SM, SM	A-1-b, A-2-4, A-4	0-1	0-12	89-100	70-100	48-84	22-46	20-37	6-17
	48-80	Gravelly sandy loam, gravelly fine sandy loam, gravelly loamy sand	GM, SM	A-1-b, A-2-4	0-5	3-14	63-90	35-90	25-75	11-41	0-27	NP-10
Burton----------	0-15	Sandy clay loam	SM	A-2-4, A-4, A-5	0-8	0-10	81-100	63-100	45-85	22-47	38-72	2-11
	15-24	Sandy loam, loam, gravelly sandy loam	SC-SM, SM	A-2, A-4, A-2-4	0	0-16	76-100	53-100	38-85	18-47	16-31	2-12
	24-27	Weathered bedrock			---	---	---	---	---	---	---	---
	27-80	Unweathered bedrock			---	---	---	---	---	---	---	---
WsF:												
Wayah-----------	0-14	Loam	ML, SM	A-2, A-4, A-5	0-2	0-6	88-100	66-100	53-96	37-71	42-77	5-16
	14-48	Sandy loam, fine sandy loam, gravelly sandy loam	GM, ML, SC-SM, SM	A-1-b, A-2-4, A-4	0-1	0-12	89-100	70-100	48-84	22-46	20-37	6-17
	48-80	Gravelly sandy loam, gravelly fine sandy loam, gravelly loamy sand	GM, SM	A-1-b, A-2-4	0-5	3-14	63-90	35-90	25-75	11-41	0-27	NP-10
Burton----------	0-15	Sandy clay loam	SM	A-2-4, A-4, A-5	0-8	0-10	81-100	63-100	45-85	22-47	38-72	2-11
	15-24	Sandy loam, loam, gravelly sandy loam	SC-SM, SM	A-2, A-4, A-2-4	0	0-16	76-100	53-100	38-85	18-47	16-31	2-12
	24-27	Weathered bedrock			---	---	---	---	---	---	---	---
	27-80	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
WtB:												
Whiteside-------	0-14	Loam	SM, SC-SM	A-2, A-4, A-5	0	0-5	90-100	71-100	58-94	39-68	25-50	2-11
	14-47	Sandy clay loam, loam, fine sandy loam	SC-SM, SM	A-2, A-4, A-5, A-6	0	0-5	90-100	72-100	59-91	31-53	27-39	12-19
	47-53	Sandy loam, loamy fine sand, loamy sand	SC-SM, SM	A-1-b, A-2-4	0	0-5	89-100	71-100	50-87	24-51	0-32	NP-13
	53-80	Sandy clay loam, fine sandy loam, sandy loam	SM, SC-SM, ML	A-2-4, A-4	0	0-5	90-100	72-100	53-100	25-61	18-44	4-25

Table 18.—Physical and Chemical Properties of the Soils

(Entries under "Erosion factors--T" apply to the entire profile. Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Soil reaction	Organic matter	Erosion factors		
									Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
AcD:											
Ashe	0-5	7-20	1.35-1.60	2-6	0.13-0.18	0.0-2.9	3.6-6.0	2.0-6.0	.10	.15	2
	5-25	7-20	1.35-1.60	2-6	0.10-0.14	0.0-2.9	3.6-6.0	0.0-1.0	.15	.17	
	25-30	5-15	1.45-1.65	2-6	0.08-0.12	0.0-2.9	3.6-6.0	0.0-0.5	.24	.37	
	30-80	---	---	---	0.00-0.00	---	---	---	---	---	
Cleveland	0-5	6-20	1.20-1.50	2-6	0.08-0.12	0.0-2.9	4.5-6.0	2.0-6.0	.20	.24	1
	5-14	6-20	1.20-1.50	2-6	0.08-0.12	0.0-2.9	4.5-6.0	0.0-1.0	.24	.32	
	14-80	---	---	---	0.00-0.01	---	---	---	---	---	
Rock outcrop	0-80	---	---	---	0.00-0.01	---	---	---	---	---	--
ArE:											
Ashe	0-5	7-20	1.35-1.60	2-6	0.13-0.18	0.0-2.9	3.6-6.0	2.0-6.0	.24	.24	2
	5-25	7-20	1.35-1.60	2-6	0.10-0.14	0.0-2.9	3.6-6.0	0.0-1.0	.17	.24	
	25-30	5-15	1.45-1.65	2-6	0.08-0.12	0.0-2.9	3.6-6.0	0.0-0.5	.17	.24	
	30-80	---	---	---	0.00-0.00	---	---	---	---	---	
Cleveland	0-5	6-20	1.20-1.50	2-6	0.08-0.12	0.0-2.9	4.5-6.0	2.0-6.0	.24	.24	1
	5-14	6-20	1.20-1.50	2-6	0.08-0.12	0.0-2.9	4.5-6.0	0.0-1.0	.24	.24	
	14-80	---	---	---	0.00-0.01	---	---	---	---	---	
Rock outcrop.											
ArF:											
Ashe	0-5	7-20	1.35-1.60	2-6	0.13-0.18	0.0-2.9	3.6-6.0	2.0-6.0	.10	.15	2
	5-25	7-20	1.35-1.60	2-6	0.10-0.14	0.0-2.9	3.6-6.0	0.0-1.0	.15	.17	
	25-30	5-15	1.45-1.65	2-6	0.08-0.12	0.0-2.9	3.6-6.0	0.0-0.5	.24	.37	
	30-80	---	---	---	0.00-0.00	---	---	---	---	---	
Cleveland	0-5	6-20	1.20-1.50	2-6	0.08-0.12	0.0-2.9	4.5-6.0	2.0-6.0	.20	.24	1
	5-14	6-20	1.20-1.50	2-6	0.08-0.12	0.0-2.9	4.5-6.0	0.0-1.0	.24	.32	
	14-80	---	---	---	0.00-0.01	---	---	---	---	---	
Rock outcrop.											
BaA:											
Biltmore	0-8	1-8	1.20-1.65	2-6	0.10-0.15	0.0-2.9	5.1-7.8	0.0-2.0	.10	.10	5
	8-80	0-4	1.20-1.70	6-20	0.06-0.10	0.0-2.9	5.1-7.8	0.0-0.5	.10	.10	
BkB2:											
Braddock	0-11	27-40	1.20-1.50	0.6-2	0.14-0.19	0.0-2.9	3.6-5.5	0.0-2.0	.24	.24	5
	11-57	35-55	1.20-1.50	0.6-2	0.12-0.17	3.0-5.9	3.6-5.5	0.0-1.0	.20	.20	
	57-80	18-35	1.20-1.50	0.6-6	0.06-0.12	0.0-2.9	3.6-5.5	0.0-1.0	.32	.32	
BkC2:											
Braddock	0-11	27-40	1.20-1.50	0.6-2	0.14-0.19	0.0-2.9	3.6-5.5	0.0-2.0	.24	.24	5
	11-57	35-55	1.20-1.50	0.6-2	0.12-0.17	3.0-5.9	3.6-5.5	0.0-1.0	.20	.20	
	57-80	18-35	1.20-1.50	0.6-6	0.06-0.12	0.0-2.9	3.6-5.5	0.0-1.0	.32	.32	
BkD2:											
Braddock	0-11	27-40	1.20-1.50	0.6-2	0.14-0.19	0.0-2.9	3.6-5.5	0.0-2.0	.24	.24	5
	11-57	35-55	1.20-1.50	0.6-2	0.12-0.17	3.0-5.9	3.6-5.5	0.0-1.0	.20	.20	
	57-80	18-35	1.20-1.50	0.6-6	0.06-0.12	0.0-2.9	3.6-5.5	0.0-1.0	.32	.32	

Table 18.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Soil reaction	Organic matter	Erosion factors		
									Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
BnD:											
Buladean----------	0-3	12-27	1.30-1.65	2-6	0.14-0.20	0.0-2.9	3.6-6.0	2.0-6.0	.17	.20	3
	3-26	5-20	1.30-1.65	2-6	0.12-0.18	0.0-2.9	3.6-6.0	0.0-1.0	.32	.37	
	26-50	2-18	1.45-1.75	2-6	0.07-0.14	0.0-2.9	3.6-6.0	0.0-0.5	.17	.24	
	50-80	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
Chestnut----------	0-2	5-20	1.35-1.60	2-6	0.10-0.15	0.0-2.9	3.6-6.0	2.0-6.0	.20	.28	2
	2-27	5-20	1.35-1.60	2-6	0.08-0.12	0.0-2.9	3.6-6.0	0.0-1.0	.32	.37	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
BnE:											
Buladean----------	0-3	12-27	1.30-1.65	2-6	0.14-0.20	0.0-2.9	3.6-6.0	2.0-6.0	.17	.20	3
	3-26	5-20	1.30-1.65	2-6	0.12-0.18	0.0-2.9	3.6-6.0	0.0-1.0	.32	.37	
	26-50	2-18	1.45-1.75	2-6	0.07-0.14	0.0-2.9	3.6-6.0	0.0-0.5	.17	.24	
	50-80	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
Chestnut----------	0-2	5-20	1.35-1.60	2-6	0.10-0.15	0.0-2.9	3.6-6.0	2.0-6.0	.20	.28	2
	2-27	5-20	1.35-1.60	2-6	0.08-0.12	0.0-2.9	3.6-6.0	0.0-1.0	.32	.37	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
BnF:											
Buladean----------	0-3	12-27	1.30-1.65	2-6	0.14-0.20	0.0-2.9	3.6-6.0	2.0-6.0	.17	.20	3
	3-26	5-20	1.30-1.65	2-6	0.12-0.18	0.0-2.9	3.6-6.0	0.0-1.0	.32	.37	
	26-50	2-18	1.45-1.75	2-6	0.07-0.14	0.0-2.9	3.6-6.0	0.0-0.5	.17	.24	
	50-80	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
Chestnut----------	0-2	5-20	1.35-1.60	2-6	0.10-0.15	0.0-2.9	3.6-6.0	2.0-6.0	.20	.28	2
	2-27	5-20	1.35-1.60	2-6	0.08-0.12	0.0-2.9	3.6-6.0	0.0-1.0	.32	.37	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
CaD:											
Calvin------------	0-8	5-27	1.40-1.60	2-6	0.10-0.16	0.0-2.9	3.6-5.5	2.0-6.0	.20	.43	2
	8-26	10-27	1.40-1.60	2-6	0.06-0.14	0.0-2.9	3.6-5.5	0.0-0.5	.15	.49	
	26-35	12-22	1.30-1.45	2-20	0.04-0.09	0.0-2.9	3.6-5.5	0.5-2.0	.15	.28	
	35-80	---	---	---	0.00-0.00	---	---	---	---	---	
CaE:											
Calvin------------	0-8	5-27	1.40-1.60	2-6	0.10-0.16	0.0-2.9	3.6-5.5	2.0-6.0	.20	.43	2
	8-26	10-27	1.40-1.60	2-6	0.06-0.14	0.0-2.9	3.6-5.5	0.0-0.5	.15	.49	
	26-35	12-22	1.30-1.45	2-20	0.04-0.09	0.0-2.9	3.6-5.5	0.5-2.0	.15	.28	
	35-80	---	---	---	0.00-0.00	---	---	---	---	---	
CaF:											
Calvin------------	0-8	5-27	1.40-1.60	2-6	0.10-0.16	0.0-2.9	3.6-5.5	2.0-6.0	.20	.43	2
	8-26	10-27	1.40-1.60	2-6	0.06-0.14	0.0-2.9	3.6-5.5	0.0-0.5	.15	.49	
	26-35	12-22	1.30-1.45	2-20	0.04-0.09	0.0-2.9	3.6-5.5	0.5-2.0	.15	.28	
	35-80	---	---	---	0.00-0.00	---	---	---	---	---	
CfF:											
Cataska-----------	0-4	5-27	1.40-1.60	2-6	0.10-0.16	0.0-2.9	3.6-5.5	2.0-6.0	.20	.43	1
	4-12	12-22	1.30-1.45	2-20	0.04-0.09	0.0-2.9	3.6-5.5	0.5-2.0	.15	.28	
	12-28	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
	28-80	---	---	---	0.00-0.00	---	---	---	---	---	
Sylco-------------	0-5	15-25	1.00-1.20	2-6	0.11-0.16	0.0-2.9	3.6-5.5	2.0-6.0	.20	.28	2
	5-23	10-27	1.20-1.50	2-6	0.10-0.16	0.0-2.9	4.5-5.5	0.0-1.0	.32	.43	
	23-80	---	---	---	0.00-0.00	---	---	---	---	---	
Rock outcrop.											

Table 18.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Soil reaction	Organic matter	Erosion factors		
									Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
ChD:											
Cheoah------------	0-12	10-25	1.35-1.60	2-6	0.15-0.24	0.0-2.9	3.6-5.5	6.0-14	.28	.28	3
	12-38	5-18	1.35-1.60	2-6	0.14-0.22	0.0-2.9	3.6-5.5	0.0-1.0	.32	.32	
	38-51	5-25	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.6-5.5	0.0-1.0	.20	.32	
	51-80	---	---	---	0.00-0.10	---	---	0.0-0.0	---	---	
Jeffrey-----------	0-8	10-25	1.35-1.60	2-6	0.15-0.24	0.0-2.9	3.6-5.5	6.0-14	.28	.28	2
	8-31	5-25	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.6-5.5	0.0-1.0	.20	.32	
	31-80	---	---	---	0.00-0.01	---	---	---	---	---	
ChE:											
Cheoah------------	0-12	10-25	1.35-1.60	2-6	0.15-0.24	0.0-2.9	3.6-5.5	6.0-14	.28	.28	3
	12-38	5-18	1.35-1.60	2-6	0.14-0.22	0.0-2.9	3.6-5.5	0.0-1.0	.32	.32	
	38-51	5-25	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.6-5.5	0.0-1.0	.20	.32	
	51-80	---	---	---	0.00-0.10	---	---	0.0-0.0	---	---	
Jeffrey-----------	0-8	10-25	1.35-1.60	2-6	0.15-0.24	0.0-2.9	3.6-5.5	6.0-14	.28	.28	2
	8-31	5-25	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.6-5.5	0.0-1.0	.20	.32	
	31-80	---	---	---	0.00-0.01	---	---	---	---	---	
ChF:											
Cheoah------------	0-12	10-25	1.35-1.60	2-6	0.15-0.24	0.0-2.9	3.6-5.5	6.0-14	.28	.28	3
	12-38	5-18	1.35-1.60	2-6	0.14-0.22	0.0-2.9	3.6-5.5	0.0-1.0	.32	.32	
	38-51	5-25	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.6-5.5	0.0-1.0	.20	.32	
	51-80	---	---	---	0.00-0.10	---	---	0.0-0.0	---	---	
Jeffrey-----------	0-8	10-25	1.35-1.60	2-6	0.15-0.24	0.0-2.9	3.6-5.5	6.0-14	.28	.28	2
	8-31	5-25	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.6-5.5	0.0-1.0	.20	.32	
	31-80	---	---	---	0.00-0.01	---	---	---	---	---	
CsD:											
Chestoa-----------	0-13	10-20	1.35-1.50	0.6-6	0.10-0.15	0.0-2.9	3.6-5.5	6.0-14	.17	.24	2
	13-26	5-20	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.6-5.5	0.0-1.0	.20	.32	
	26-80	---	---	---	0.00-0.01	---	---	---	---	---	
CsE:											
Chestoa-----------	0-13	10-20	1.35-1.50	0.6-6	0.10-0.15	0.0-2.9	3.6-5.5	6.0-14	.17	.24	2
	13-26	5-20	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.6-5.5	0.0-1.0	.20	.32	
	26-80	---	---	---	0.00-0.01	---	---	---	---	---	
CsF:											
Chestoa-----------	0-13	10-20	1.35-1.50	0.6-6	0.10-0.15	0.0-2.9	3.6-5.5	6.0-14	.17	.24	2
	13-26	5-20	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.6-5.5	0.0-1.0	.20	.32	
	26-80	---	---	---	0.00-0.01	---	---	---	---	---	
CtB2:											
Clifton-----------	0-8	27-40	1.25-1.35	0.6-2	0.15-0.20	0.0-2.9	4.5-6.5	0.0-2.0	.28	.28	5
	8-55	35-55	1.20-1.60	0.6-2	0.15-0.20	3.0-5.9	4.5-6.5	0.0-1.0	.28	.28	
	55-80	5-27	1.20-1.35	2-6	0.11-0.15	0.0-2.9	4.5-6.5	0.0-0.5	.28	.28	
CtC2:											
Clifton-----------	0-8	27-40	1.25-1.35	0.6-2	0.15-0.20	0.0-2.9	4.5-6.5	0.0-2.0	.28	.28	5
	8-55	35-55	1.20-1.60	0.6-2	0.15-0.20	3.0-5.9	4.5-6.5	0.0-1.0	.28	.28	
	55-80	5-27	1.20-1.35	2-6	0.11-0.15	0.0-2.9	4.5-6.5	0.0-0.5	.28	.28	
CtD2:											
Clifton-----------	0-8	27-40	1.25-1.35	0.6-2	0.15-0.20	0.0-2.9	4.5-6.5	0.0-2.0	.28	.28	5
	8-55	35-55	1.20-1.60	0.6-2	0.15-0.20	3.0-5.9	4.5-6.5	0.0-1.0	.28	.28	
	55-80	5-27	1.20-1.35	2-6	0.11-0.15	0.0-2.9	4.5-6.5	0.0-0.5	.28	.28	

Table 18.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Soil reaction	Organic matter	Erosion factors		
									Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
CtE2:											
Clifton-----------	0-8	27-40	1.25-1.35	0.6-2	0.15-0.20	0.0-2.9	4.5-6.5	0.0-2.0	.28	.28	5
	8-55	35-55	1.20-1.60	0.6-2	0.15-0.20	3.0-5.9	4.5-6.5	0.0-1.0	.28	.28	
	55-80	5-27	1.20-1.35	2-6	0.11-0.15	0.0-2.9	4.5-6.5	0.0-0.5	.28	.28	
CxC:											
Clifton-----------	0-8	27-40	1.25-1.35	0.6-2	0.15-0.20	0.0-2.9	4.5-6.5	0.0-0.5	.28	.28	5
	8-55	35-55	1.20-1.60	0.6-2	0.15-0.20	3.0-5.9	4.5-6.5	0.0-1.0	.28	.28	
	55-80	5-27	1.20-1.35	2-6	0.11-0.15	0.0-2.9	4.5-6.5	0.0-0.5	.28	.28	
Urban land.											
DeA:											
Dellwood----------	0-8	5-15	1.30-1.50	2-6	0.08-0.12	0.0-2.9	4.5-7.3	4.0-8.0	.10	.20	3
	8-16	1-8	1.40-1.60	6-20	0.02-0.05	0.0-2.9	4.5-7.3	4.0-8.0	.05	.10	
	16-80	1-4	1.40-1.60	6-20	0.02-0.05	0.0-2.9	4.5-7.3	0.0-0.5	.05	.10	
Reddies-----------	0-14	5-18	1.30-1.50	2-6	0.10-0.18	0.0-2.9	4.5-7.3	4.0-8.0	.20	.20	3
	14-26	5-18	1.35-1.55	2-6	0.08-0.15	0.0-2.9	4.5-7.3	0.0-1.0	.10	.20	
	26-80	1-5	1.40-1.60	6-20	0.02-0.05	0.0-2.9	4.5-7.3	0.0-0.5	.05	.15	
DrB:											
Dillard-----------	0-7	10-25	1.20-1.50	0.6-2	0.15-0.20	0.0-2.9	5.1-6.0	4.0-8.0	.32	.32	5
	7-50	18-35	1.40-1.60	0.6-2	0.12-0.16	0.0-2.9	4.5-5.5	0.0-1.0	.28	.28	
	50-80	5-18	1.35-1.55	2-6	0.08-0.15	0.0-2.9	4.5-5.5	0.0-1.0	.28	.28	
DtD:											
Ditney------------	0-7	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	2
	7-25	5-18	1.50-1.65	2-6	0.10-0.15	0.0-2.9	3.6-5.5	0.0-1.0	.24	.24	
	25-30	5-18	1.50-1.65	2-6	0.05-0.13	0.0-2.9	3.6-5.5	0.0-1.0	.17	.24	
	30-80	---	---	---	0.00-0.01	---	---	---	---	---	
Unicoi------------	0-5	5-20	1.45-1.55	2-6	0.08-0.12	0.0-2.9	3.6-5.5	2.0-6.0	.20	.28	1
	5-16	5-20	1.45-1.60	2-6	0.04-0.09	0.0-2.9	3.6-5.5	0.0-1.0	.15	.24	
	16-80	---	---	---	0.00-0.01	---	---	---	---	---	
DuE:											
Ditney------------	0-7	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	2
	7-25	5-18	1.50-1.65	2-6	0.10-0.15	0.0-2.9	3.6-5.5	0.0-1.0	.24	.24	
	25-30	5-18	1.50-1.65	2-6	0.05-0.13	0.0-2.9	3.6-5.5	0.0-1.0	.17	.24	
	30-80	---	---	---	0.00-0.01	---	---	---	---	---	
Unicoi------------	0-5	5-20	1.45-1.55	2-6	0.08-0.12	0.0-2.9	3.6-5.5	2.0-6.0	.20	.28	1
	5-16	5-20	1.45-1.60	2-6	0.04-0.09	0.0-2.9	3.6-5.5	0.0-1.0	.15	.24	
	16-80	---	---	---	0.00-0.01	---	---	---	---	---	
DuF:											
Ditney------------	0-7	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	2
	7-25	5-18	1.50-1.65	2-6	0.10-0.15	0.0-2.9	3.6-5.5	0.0-1.0	.20	.28	
	25-30	5-18	1.50-1.65	2-6	0.05-0.13	0.0-2.9	3.6-5.5	0.0-1.0	.17	.37	
	30-80	---	---	---	0.00-0.01	---	---	---	---	---	
Unicoi------------	0-5	5-20	1.45-1.55	2-6	0.08-0.12	0.0-2.9	3.6-5.5	2.0-6.0	.10	.20	1
	5-16	5-20	1.45-1.60	2-6	0.04-0.09	0.0-2.9	3.6-5.5	0.0-1.0	.10	.32	
	16-80	---	---	---	0.00-0.01	---	---	---	---	---	

Table 18.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Soil reaction	Organic matter	Erosion factors		
									Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
EdD:											
Edneyville--------	0-5	5-18	1.40-1.60	2-6	0.11-0.17	0.0-2.9	3.6-6.0	2.0-6.0	.15	.20	5
	5-43	7-20	1.40-1.60	2-6	0.10-0.16	0.0-2.9	3.6-6.0	0.0-1.0	.17	.24	
	43-80	5-20	1.40-1.60	2-6	0.08-0.14	0.0-2.9	3.6-6.0	0.0-0.5	.17	.24	
Chestnut----------	0-4	5-20	1.35-1.60	2-6	0.08-0.12	0.0-2.9	3.6-6.0	2.0-6.0	.10	.17	2
	4-36	5-25	1.35-1.60	2-6	0.08-0.12	0.0-2.9	3.6-6.0	0.0-1.0	.15	.24	
	36-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
EdE:											
Edneyville--------	0-5	5-18	1.40-1.60	2-6	0.11-0.17	0.0-2.9	3.6-6.0	2.0-6.0	.15	.20	5
	5-43	7-20	1.40-1.60	2-6	0.10-0.16	0.0-2.9	3.6-6.0	0.0-1.0	.17	.24	
	43-80	5-20	1.40-1.60	2-6	0.08-0.14	0.0-2.9	3.6-6.0	0.0-0.5	.17	.24	
Chestnut----------	0-4	5-20	1.35-1.60	2-6	0.08-0.12	0.0-2.9	3.6-6.0	2.0-6.0	.10	.17	2
	4-36	5-25	1.35-1.60	2-6	0.08-0.12	0.0-2.9	3.6-6.0	0.0-1.0	.15	.24	
	36-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
EdF:											
Edneyville--------	0-5	5-18	1.40-1.60	2-6	0.11-0.17	0.0-2.9	3.6-6.0	2.0-6.0	.15	.20	5
	5-43	7-20	1.40-1.60	2-6	0.10-0.16	0.0-2.9	3.6-6.0	0.0-1.0	.17	.24	
	43-80	5-20	1.40-1.60	2-6	0.08-0.14	0.0-2.9	3.6-6.0	0.0-0.5	.17	.24	
Chestnut----------	0-4	5-20	1.35-1.60	2-6	0.08-0.12	0.0-2.9	3.6-6.0	2.0-6.0	.10	.17	2
	4-36	5-25	1.35-1.60	2-6	0.08-0.12	0.0-2.9	3.6-6.0	0.0-1.0	.15	.24	
	36-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
EfA:											
Ela, drained------	0-13	5-18	1.30-1.50	2-6	0.13-0.20	0.0-2.9	4.5-6.5	8.0-12	.20	.20	4
	13-38	5-18	1.30-1.50	2-6	0.10-0.15	0.0-2.9	4.5-6.5	0.0-0.5	.20	.32	
	38-80	1-18	1.40-1.60	2-6	0.03-0.05	0.0-2.9	4.5-6.5	0.0-0.5	.10	.17	
Ela, undrained----	0-15	5-18	1.30-1.50	2-6	0.13-0.20	0.0-2.9	4.5-6.5	5.0-12	.20	.20	4
	15-28	5-18	1.30-1.50	2-6	0.10-0.15	0.0-2.9	4.5-6.5	5.0-12	.20	.32	
	28-80	5-15	1.40-1.60	6-20	0.02-0.05	0.0-2.9	4.5-6.5	0.0-0.5	.05	.10	
EvD2:											
Evard-------------	0-5	25-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	0.0-2.0	.24	.24	5
	5-29	18-35	1.30-1.50	0.6-2	0.15-0.18	0.0-2.9	4.5-6.0	0.0-1.0	.24	.28	
	29-37	12-20	1.20-1.40	0.6-2	0.08-0.18	0.0-2.9	4.5-6.0	0.0-1.0	.24	.28	
	37-80	5-20	1.20-1.40	0.6-2	0.05-0.17	0.0-2.9	4.5-6.0	0.0-0.5	.24	.32	
Cowee-------------	0-5	25-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	0.0-2.0	.24	.24	2
	5-27	18-35	1.30-1.60	0.6-2	0.12-0.18	0.0-2.9	3.6-6.0	0.0-1.0	.24	.28	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
EvE2:											
Evard-------------	0-5	25-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	0.0-2.0	.24	.24	5
	5-29	18-35	1.30-1.50	0.6-2	0.15-0.18	0.0-2.9	4.5-6.0	0.0-1.0	.24	.28	
	29-37	12-20	1.20-1.40	0.6-2	0.08-0.18	0.0-2.9	4.5-6.0	0.0-1.0	.24	.28	
	37-80	5-20	1.20-1.40	0.6-2	0.05-0.17	0.0-2.9	4.5-6.0	0.0-0.5	.24	.32	
Cowee-------------	0-5	25-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	0.0-2.0	.24	.24	2
	5-27	18-35	1.30-1.60	0.6-2	0.12-0.18	0.0-2.9	3.6-6.0	0.0-1.0	.24	.28	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	

Table 18.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Soil reaction	Organic matter	Erosion factors		
									Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
EvF2:											
Evard-------------	0-5	25-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	2.0-6.0	.24	.24	5
	5-29	18-35	1.30-1.50	0.6-2	0.15-0.18	0.0-2.9	4.5-6.0	0.0-1.0	.24	.28	
	29-37	12-20	1.20-1.40	0.6-2	0.08-0.18	0.0-2.9	4.5-6.0	0.0-1.0	.24	.28	
	37-80	5-20	1.20-1.40	0.6-2	0.05-0.17	0.0-2.9	4.5-6.0	0.0-0.5	.24	.32	
Cowee-------------	0-5	25-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	2.0-6.0	.24	.24	2
	5-27	18-35	1.30-1.60	0.6-2	0.12-0.18	0.0-2.9	3.6-6.0	0.0-1.0	.24	.28	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
EwD:											
Evard-------------	0-5	10-25	1.30-1.60	2-6	0.10-0.14	0.0-2.9	4.5-6.0	2.0-6.0	.24	.24	5
	5-32	20-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	0.0-1.0	.24	.24	
	32-45	12-25	1.20-1.40	0.6-2	0.10-0.25	0.0-2.9	4.5-6.0	0.0-0.5	.24	.24	
	45-80	5-20	1.20-1.40	0.6-2	0.08-0.12	0.0-2.9	4.5-6.0	0.0-0.5	.24	.24	
Cowee-------------	0-5	8-20	1.25-1.60	2-6	0.12-0.20	0.0-2.9	4.5-6.0	2.0-6.0	.28	.28	2
	5-38	18-35	1.30-1.60	0.6-2	0.12-0.18	0.0-2.9	4.5-6.0	0.0-1.0	.24	.28	
	38-80	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
EwE:											
Evard-------------	0-5	10-25	1.30-1.60	2-6	0.10-0.14	0.0-2.9	4.5-6.0	2.0-6.0	.24	.24	5
	5-32	20-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	0.0-1.0	.24	.24	
	32-45	12-25	1.20-1.40	0.6-2	0.10-0.25	0.0-2.9	4.5-6.0	0.0-0.5	.24	.24	
	45-80	5-20	1.20-1.40	0.6-2	0.08-0.12	0.0-2.9	4.5-6.0	0.0-0.5	.24	.24	
Cowee-------------	0-5	8-20	1.25-1.60	2-6	0.12-0.20	0.0-2.9	4.5-6.0	1.0-5.0	.28	.28	2
	5-38	18-35	1.30-1.60	0.6-2	0.12-0.18	0.0-2.9	4.5-6.0	0.5-1.0	.24	.28	
	38-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
EwF:											
Evard-------------	0-5	10-25	1.30-1.60	2-6	0.10-0.14	0.0-2.9	4.5-6.0	2.0-6.0	.24	.24	5
	5-32	20-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	0.0-1.0	.24	.24	
	32-45	12-25	1.20-1.40	0.6-2	0.10-0.25	0.0-2.9	4.5-6.0	0.0-0.5	.24	.24	
	45-80	5-20	1.20-1.40	0.6-2	0.08-0.12	0.0-2.9	4.5-6.0	0.0-0.5	.24	.24	
Cowee-------------	0-5	8-20	1.25-1.60	2-6	0.12-0.20	0.0-2.9	4.5-6.0	1.0-5.0	.28	.28	2
	5-38	18-35	1.30-1.60	0.6-2	0.12-0.18	0.0-2.9	4.5-6.0	0.5-1.0	.24	.28	
	38-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
FnD2:											
Fannin------------	0-2	20-35	1.30-1.50	0.6-2	0.12-0.18	0.0-2.9	3.6-6.5	0.0-2.0	.28	.28	5
	2-31	18-35	1.30-1.50	0.6-2	0.11-0.17	0.0-2.9	3.6-6.5	0.0-1.0	.32	.32	
	31-80	5-25	1.30-1.50	0.6-2	0.08-0.12	0.0-2.9	3.6-6.5	0.0-0.5	.32	.32	
FrA:											
French------------	0-12	8-27	1.40-1.60	0.6-2	0.15-0.20	0.0-2.9	5.1-6.5	4.0-8.0	.28	.28	2
	12-30	8-35	1.30-1.50	0.6-2	0.12-0.20	0.0-2.9	5.1-6.5	0.0-1.0	.32	.32	
	30-80	1-5	1.40-1.60	6-20	0.02-0.05	0.0-2.9	5.1-6.5	0.0-0.5	.05	.15	
HcE:											
Heintooga---------	0-12	10-35	0.50-1.00	2-6	---	0.0-2.9	3.4-5.5	10-20	.10	.24	5
	12-25	5-15	1.00-1.50	2-6	---	0.0-2.9	3.4-5.5	0.0-1.0	.05	.24	
	25-80	5-15	1.00-1.50	2-6	---	0.0-2.9	3.4-5.5	0.0-1.0	.05	.24	
Chiltoskie--------	0-8	18-30	0.66-1.30	2-6	0.17-0.22	0.0-2.9	3.6-5.5	10-20	.20	.24	5
	8-43	10-25	1.28-1.52	2-6	0.18-0.20	0.0-2.9	3.6-5.5	0.0-1.0	.20	.28	
	43-80	5-15	1.30-1.45	2-6	0.07-0.09	0.0-2.9	3.6-5.5	0.0-1.0	.10	.24	

Table 18.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Soil reaction	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
HpA:											
Hemphill----------	0-13	27-40	1.20-1.45	0.2-0.6	0.16-0.22	0.0-2.9	4.5-7.3	4.0-8.0	.28	.28	5
	13-38	35-60	1.20-1.45	0.06-0.2	0.15-0.20	0.0-2.9	4.5-7.3	0.5-5.0	.28	.28	
	38-80	8-30	1.20-1.45	0.6-2	0.12-0.20	0.0-2.9	4.5-7.3	0.0-0.5	.24	.24	
JbD:											
Junaluska---------	0-2	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	2.0-6.0	.24	.24	2
	2-11	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	1.0-3.0	.24	.24	
	11-21	18-35	1.30-1.65	0.6-2	0.12-0.18	0.0-2.9	3.6-6.0	0.0-1.0	.15	.24	
	21-26	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	2.0-6.0	.24	.24	
	26-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Brasstown---------	0-6	5-18	1.00-1.40	2-6	0.12-0.18	0.0-2.9	3.6-6.0	2.0-6.0	.28	.28	3
	6-36	18-35	1.35-1.60	0.6-2	0.12-0.18	0.0-2.9	3.6-6.0	0.0-1.0	.15	.28	
	36-45	8-20	1.40-1.65	0.6-2	0.10-0.15	0.0-2.9	3.6-6.0	0.0-0.5	.15	.28	
	45-80	---	---	---	0.00-0.10	---	---	0.0-0.0	---	---	
JbE:											
Junaluska---------	0-2	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	2.0-6.0	.24	.24	2
	2-11	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	1.0-3.0	.24	.24	
	11-21	18-35	1.30-1.65	0.6-2	0.12-0.18	0.0-2.9	3.6-6.0	0.0-1.0	.15	.24	
	21-26	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	2.0-6.0	.24	.24	
	26-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Brasstown---------	0-6	5-18	1.00-1.40	2-6	0.12-0.18	0.0-2.9	3.6-6.0	2.0-6.0	.28	.28	3
	6-36	18-35	1.35-1.60	0.6-2	0.12-0.18	0.0-2.9	3.6-6.0	0.0-1.0	.15	.28	
	36-45	8-20	1.40-1.65	0.6-2	0.10-0.15	0.0-2.9	3.6-6.0	0.0-0.5	.15	.28	
	45-80	---	---	---	0.00-0.10	---	---	0.0-0.0	---	---	
JbF:											
Junaluska---------	0-2	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	2.0-6.0	.24	.24	2
	2-11	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	1.0-3.0	.24	.24	
	11-21	18-35	1.30-1.65	0.6-2	0.12-0.18	0.0-2.9	3.6-6.0	0.0-1.0	.15	.24	
	21-26	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	2.0-6.0	.24	.24	
	26-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Brasstown---------	0-6	5-18	1.00-1.40	2-6	0.12-0.18	0.0-2.9	3.6-6.0	2.0-6.0	.28	.28	3
	6-36	18-35	1.35-1.60	0.6-2	0.12-0.18	0.0-2.9	3.6-6.0	0.0-1.0	.15	.28	
	36-45	8-20	1.40-1.65	0.6-2	0.10-0.15	0.0-2.9	3.6-6.0	0.0-0.5	.15	.28	
	45-80	---	---	---	0.00-0.10	---	---	0.0-0.0	---	---	
KnC:											
Keener------------	0-7	7-27	1.35-1.60	2-6	0.14-0.18	0.0-2.9	3.6-6.0	2.0-6.0	.20	.24	5
	7-38	20-35	1.30-1.45	0.6-2	0.10-0.15	0.0-2.9	3.6-6.0	0.0-1.0	.24	.32	
	38-80	10-35	1.30-1.45	2-6	0.08-0.12	0.0-2.9	3.6-6.0	0.0-0.5	.17	.32	
MwC:											
Mars Hill---------	0-3	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	3
	3-9	5-20	1.35-1.60	2-6	0.13-0.20	0.0-2.9	4.5-7.3	0.0-0.5	.24	.24	
	9-35	5-20	1.35-1.65	2-6	0.10-0.19	0.0-2.9	5.1-7.3	0.0-1.0	.24	.24	
	35-46	5-20	1.40-1.80	2-6	0.08-0.16	0.0-2.9	5.1-7.3	0.0-0.5	.20	.24	
	46-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	

Table 18.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Soil reaction	Organic matter	Erosion factors		
									Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
MwC:											
Walnut------------	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	2
	2-9	5-20	1.35-1.60	2-6	0.13-0.20	0.0-2.9	4.5-7.3	0.0-0.5	.24	.24	
	9-21	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.24	.24	
	21-27	5-20	1.40-1.80	2-6	0.08-0.12	0.0-2.9	5.1-7.3	0.0-0.5	.15	.24	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
MwD:											
Mars Hill---------	0-3	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	3
	3-9	5-20	1.35-1.60	2-6	0.13-0.20	0.0-2.9	4.5-7.3	0.0-0.5	.24	.24	
	9-35	5-20	1.35-1.65	2-6	0.10-0.19	0.0-2.9	5.1-7.3	0.0-1.0	.24	.24	
	35-46	5-20	1.40-1.80	2-6	0.08-0.16	0.0-2.9	5.1-7.3	0.0-0.5	.20	.24	
	46-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Walnut------------	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	2
	2-9	5-20	1.35-1.60	2-6	0.13-0.20	0.0-2.9	4.5-7.3	0.0-0.5	.24	.24	
	9-21	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.24	.24	
	21-27	5-20	1.40-1.80	2-6	0.08-0.12	0.0-2.9	5.1-7.3	0.0-1.0	.15	.24	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
MwE:											
Mars Hill---------	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	3
	2-9	5-20	1.35-1.60	2-6	0.13-0.20	0.0-2.9	4.5-7.3	0.0-0.5	.24	.24	
	9-35	5-20	1.35-1.65	2-6	0.10-0.19	0.0-2.9	5.1-7.3	0.0-1.0	.24	.24	
	35-46	5-20	1.40-1.80	2-6	0.08-0.16	0.0-2.9	5.1-7.3	0.0-0.5	.20	.24	
	46-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Walnut------------	0-3	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	2
	3-9	5-20	1.35-1.60	2-6	0.13-0.20	0.0-2.9	4.5-7.3	0.0-0.5	.24	.24	
	9-21	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.24	.24	
	21-27	5-20	1.40-1.80	2-6	0.08-0.12	0.0-2.9	5.1-7.3	0.0-1.0	.15	.24	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
MwF:											
Mars Hill---------	0-3	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	3
	3-9	5-20	1.35-1.60	2-6	0.13-0.20	0.0-2.9	4.5-7.3	0.0-0.5	.24	.24	
	9-35	5-20	1.35-1.65	2-6	0.10-0.19	0.0-2.9	5.1-7.3	0.0-1.0	.24	.24	
	35-46	5-20	1.40-1.80	2-6	0.08-0.16	0.0-2.9	5.1-7.3	0.0-0.5	.20	.24	
	46-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Walnut------------	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	2
	2-9	5-20	1.35-1.60	2-6	0.13-0.20	0.0-2.9	4.5-7.3	0.0-0.5	.24	.24	
	9-21	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.24	.24	
	21-27	5-20	1.40-1.80	2-6	0.08-0.12	0.0-2.9	5.1-7.3	0.0-1.0	.15	.24	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
MyB:											
Maymead-----------	0-5	5-25	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-6.0	.20	.24	5
	5-80	7-27	1.40-1.55	2-6	0.13-0.18	0.0-2.9	4.5-5.5	0.0-1.0	.17	.24	
Northcove---------	0-3	5-18	1.30-1.50	2-6	0.06-0.11	0.0-2.9	3.6-6.0	2.0-6.0	.10	.28	5
	3-60	5-18	1.40-1.60	2-6	0.06-0.11	0.0-2.9	3.6-6.0	0.0-1.0	.10	.28	
	60-80	1-18	1.40-1.60	2-6	0.03-0.05	0.0-2.9	3.6-6.0	0.0-0.5	.10	.17	
NhC:											
Northcove---------	0-3	5-18	1.30-1.50	2-6	0.06-0.11	0.0-2.9	3.6-6.0	2.0-6.0	.10	.28	5
	3-60	5-18	1.40-1.60	2-6	0.06-0.11	0.0-2.9	3.6-6.0	0.0-1.0	.10	.28	
	60-80	1-18	1.40-1.60	2-6	0.03-0.05	0.0-2.9	3.6-6.0	0.0-0.5	.10	.17	

Table 18.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Soil reaction	Organic matter	Erosion factors Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
NhC:											
Maymead-----------	0-5	5-25	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-6.0	.20	.24	5
	5-80	7-27	1.40-1.55	2-6	0.13-0.18	0.0-2.9	4.5-5.5	0.0-1.0	.17	.24	
NtD:											
Northcove---------	0-3	5-18	1.30-1.50	2-6	0.06-0.11	0.0-2.9	3.6-6.0	2.0-6.0	.10	.28	5
	3-60	5-18	1.40-1.60	2-6	0.06-0.11	0.0-2.9	3.6-6.0	0.0-1.0	.10	.28	
	60-80	1-18	1.40-1.60	2-6	0.03-0.05	0.0-2.9	3.6-6.0	0.0-0.5	.10	.17	
Maymead-----------	0-5	5-25	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-6.0	.20	.24	5
	5-80	7-27	1.40-1.55	2-6	0.13-0.18	0.0-2.9	4.5-5.5	0.0-1.0	.17	.24	
NtE:											
Northcove---------	0-3	5-18	1.30-1.50	2-6	0.06-0.11	0.0-2.9	3.6-6.0	2.0-6.0	.10	.28	5
	3-60	5-18	1.40-1.60	2-6	0.06-0.11	0.0-2.9	3.6-6.0	0.0-1.0	.10	.28	
	60-80	1-18	1.40-1.60	2-6	0.03-0.05	0.0-2.9	3.6-6.0	0.0-0.5	.10	.17	
Maymead-----------	0-5	5-25	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-6.0	.20	.24	5
	5-80	7-27	1.40-1.55	2-6	0.13-0.18	0.0-2.9	4.5-5.5	0.0-1.0	.17	.24	
OwC:											
Oconaluftee-------	0-12	20-35	1.00-1.30	2-6	0.13-0.18	0.0-2.9	3.6-5.5	10-20	.15	.24	5
	12-44	5-18	1.20-1.50	2-6	0.11-0.17	0.0-2.9	3.6-6.0	0.0-1.0	.20	.24	
	44-80	5-18	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.6-6.0	0.0-0.5	.20	.24	
Guyot-------------	0-11	10-35	0.54-0.99	0.6-2	0.19-0.21	0.0-2.9	3.6-3.8	10-20	.24	.28	3
	11-28	7-27	1.50-1.55	2-6	0.17-0.19	0.0-2.9	4.3-4.8	0.0-1.0	.28	.37	
	28-54	5-15	1.40-1.51	2-6	0.07-0.10	0.0-2.9	4.9-5.0	0.0-0.5	.32	.43	
	54-80	---	---	---	0.00-0.00	---	---	0.0-0.0	---	---	
Cataloochee-------	0-9	18-35	---	0.6-2	0.19-0.21	0.0-2.9	3.3-3.4	10-20	.20	.24	2
	9-19	15-25	1.33-1.42	2-6	0.17-0.19	0.0-2.9	4.1-4.5	0.0-1.0	.24	.28	
	19-31	5-18	---	2-6	0.07-0.10	0.0-2.9	4.5-5.5	0.0-0.5	.15	.32	
	31-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
OwD:											
Oconaluftee-------	0-12	20-35	1.00-1.30	2-6	0.13-0.18	0.0-2.9	3.6-5.5	10-20	.15	.24	5
	12-44	5-18	1.20-1.50	2-6	0.11-0.17	0.0-2.9	3.6-6.0	0.0-1.0	.20	.24	
	44-80	5-18	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.6-6.0	0.0-0.5	.20	.24	
Guyot-------------	0-11	10-35	0.54-0.99	0.6-2	0.19-0.21	0.0-2.9	3.6-3.8	10-20	.24	.28	3
	11-28	7-27	1.50-1.55	2-6	0.17-0.19	0.0-2.9	4.3-4.8	0.0-1.0	.28	.37	
	28-54	5-15	1.40-1.51	2-6	0.07-0.10	0.0-2.9	4.9-5.0	0.0-0.5	.32	.43	
	54-80	---	---	---	0.00-0.00	---	---	0.0-0.0	---	---	
Cataloochee-------	0-9	18-35	---	0.6-2	0.19-0.21	0.0-2.9	3.3-3.4	10-20	.20	.24	2
	9-19	15-25	1.33-1.42	2-6	0.17-0.19	0.0-2.9	4.1-4.5	0.0-1.0	.24	.28	
	19-31	5-18	---	2-6	0.07-0.10	0.0-2.9	4.5-5.5	0.0-0.5	.15	.32	
	31-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
OwE:											
Oconaluftee-------	0-12	20-35	1.00-1.30	2-6	0.13-0.18	0.0-2.9	3.6-5.5	10-20	.15	.24	5
	12-44	5-18	1.20-1.50	2-6	0.11-0.17	0.0-2.9	3.6-6.0	0.0-1.0	.20	.24	
	44-80	5-18	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.6-6.0	0.0-0.5	.20	.24	
Guyot-------------	0-11	10-35	0.54-0.99	0.6-2	0.19-0.21	0.0-2.9	3.6-3.8	10-20	.24	.28	3
	11-28	7-27	1.50-1.55	2-6	0.17-0.19	0.0-2.9	4.3-4.8	0.0-1.0	.28	.37	
	28-54	5-15	1.40-1.51	2-6	0.07-0.10	0.0-2.9	4.9-5.0	0.0-0.5	.32	.43	
	54-80	---	---	---	0.00-0.00	---	---	0.0-0.0	---	---	

Table 18.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Soil reaction	Organic matter	Erosion factors		
									Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
OwE:											
Cataloochee-------	0-9	18-35	---	0.6-2	0.19-0.21	0.0-2.9	3.3-3.4	10-20	.20	.24	2
	9-19	15-25	1.33-1.42	2-6	0.17-0.19	0.0-2.9	4.1-4.5	0.0-1.0	.24	.28	
	19-31	5-18	---	2-6	0.07-0.10	0.0-2.9	4.5-5.5	0.0-0.5	.15	.32	
	31-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
OwF:											
Oconaluftee-------	0-12	20-35	1.00-1.30	2-6	0.13-0.18	0.0-2.9	3.6-5.5	10-20	.15	.24	5
	12-44	5-18	1.20-1.50	2-6	0.11-0.17	0.0-2.9	3.6-6.0	0.0-1.0	.20	.24	
	44-80	5-18	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.6-6.0	0.0-0.5	.20	.24	
Guyot-------------	0-11	10-35	0.54-0.99	0.6-2	0.19-0.21	0.0-2.9	3.6-3.8	10-20	.24	.28	3
	11-28	7-27	1.50-1.55	2-6	0.17-0.19	0.0-2.9	4.3-4.8	0.0-1.0	.28	.37	
	28-54	5-15	1.40-1.51	2-6	0.07-0.10	0.0-2.9	4.9-5.0	0.0-0.5	.32	.43	
	54-80	---	---	---	0.00-0.00	---	---	0.0-0.0	---	---	
Cataloochee-------	0-9	18-35	---	0.6-2	0.19-0.21	0.0-2.9	3.3-3.4	10-20	.20	.24	2
	9-19	15-25	1.33-1.42	2-6	0.17-0.19	0.0-2.9	4.1-4.5	0.0-1.0	.24	.28	
	19-31	5-18	---	2-6	0.07-0.10	0.0-2.9	4.5-5.5	0.0-0.5	.15	.32	
	31-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
PwC:											
Porters-----------	0-9	10-22	1.40-1.60	2-6	0.16-0.20	0.0-2.9	4.5-6.5	6.0-14	.28	.28	3
	9-54	7-25	1.40-1.60	2-6	0.10-0.20	0.0-2.9	4.5-6.5	0.0-1.0	.24	.24	
	54-80	---	---	---	0.00-0.01	---	---	---	---	---	
Unaka-------------	0-9	10-22	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	6.0-14	.17	.20	2
	9-27	7-25	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	0.0-1.0	.17	.20	
	27-31	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
	31-80	---	---	---	0.00-0.01	---	---	---	---	---	
PwD:											
Porters-----------	0-9	10-22	1.40-1.60	2-6	0.16-0.20	0.0-2.9	4.5-6.5	6.0-14	.28	.28	3
	9-54	7-25	1.40-1.60	2-6	0.10-0.20	0.0-2.9	4.5-6.5	0.0-1.0	.24	.24	
	54-80	---	---	---	0.00-0.01	---	---	---	---	---	
Unaka-------------	0-9	10-22	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	6.0-14	.17	.20	2
	9-27	7-25	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	0.0-1.0	.17	.20	
	27-31	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
	31-80	---	---	---	0.00-0.01	---	---	---	---	---	
PwE:											
Porters-----------	0-9	10-22	1.40-1.60	2-6	0.16-0.20	0.0-2.9	4.5-6.5	6.0-14	.28	.28	3
	9-54	7-25	1.40-1.60	2-6	0.10-0.20	0.0-2.9	4.5-6.5	0.0-1.0	.24	.24	
	54-80	---	---	---	0.00-0.01	---	---	---	---	---	
Unaka-------------	0-9	10-22	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	6.0-14	.17	.20	2
	9-27	7-25	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	0.0-1.0	.17	.20	
	27-31	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
	31-80	---	---	---	0.00-0.01	---	---	---	---	---	
PxF:											
Porters-----------	0-9	10-22	1.40-1.60	2-6	0.16-0.20	0.0-2.9	4.5-6.5	6.0-14	.28	.28	3
	9-54	7-25	1.40-1.60	2-6	0.10-0.20	0.0-2.9	4.5-6.5	0.0-1.0	.24	.24	
	54-80	---	---	---	0.00-0.01	---	---	---	---	---	
Unaka-------------	0-9	10-22	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	6.0-14	.17	.20	2
	9-27	7-25	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	0.0-1.0	.17	.20	
	27-31	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
	31-80	---	---	---	0.00-0.01	---	---	---	---	---	

Table 18.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Soil reaction	Organic matter	Erosion factors		
									Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
RbA:											
Reddies-----------	0-14	5-18	1.30-1.50	2-6	0.10-0.18	0.0-2.9	4.5-7.3	4.0-8.0	.20	.20	3
	14-26	5-18	1.35-1.55	2-6	0.08-0.15	0.0-2.9	4.5-7.3	0.0-1.0	.10	.20	
	26-80	1-5	1.40-1.60	6-20	0.02-0.05	0.0-2.9	4.5-7.3	0.0-0.5	.05	.15	
RcF:											
Rock outcrop.											
Cataska-----------	0-6	12-22	1.30-1.40	2-20	0.10-0.14	0.0-2.9	3.6-5.5	1.0-3.0	.15	.28	1
	6-16	12-22	1.30-1.45	2-20	0.04-0.09	0.0-2.9	3.6-5.5	0.5-2.0	.15	.28	
	16-28	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
	28-80	---	---	---	0.00-0.00	---	---	---	---	---	
RhD:											
Rock outcrop.											
Chestoa-----------	0-13	10-20	1.35-1.50	0.6-6	0.10-0.15	0.0-2.9	3.6-5.5	6.0-14	.17	.24	2
	13-26	5-20	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.6-5.5	0.0-1.0	.20	.32	
	26-80	---	---	---	0.00-0.01	---	---	---	---	---	
RhF:											
Rock outcrop.											
Chestoa-----------	0-13	10-20	1.35-1.50	0.6-6	0.10-0.15	0.0-2.9	3.6-5.5	6.0-14	.17	.24	2
	13-26	5-20	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.6-5.5	0.0-1.0	.20	.32	
	26-80	---	---	---	0.00-0.01	---	---	---	---	---	
RkF:											
Rock outcrop.											
Cleveland---------	0-5	6-20	1.20-1.50	2-6	0.08-0.12	0.0-2.9	4.5-6.0	2.0-6.0	.20	.24	1
	5-14	6-20	1.20-1.50	2-6	0.08-0.12	0.0-2.9	4.5-6.0	0.0-1.0	.24	.32	
	14-80	---	---	---	0.00-0.01	---	---	---	---	---	
RoF:											
Rock outcrop.											
Oteen-------------	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	1
	2-11	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.24	.24	
	11-15	5-20	1.40-1.80	2-6	0.07-0.12	0.0-2.9	5.1-7.3	0.0-0.5	.17	.24	
	15-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
RpF:											
Rock outcrop.											
Unicoi------------	0-5	5-20	1.45-1.55	2-6	0.08-0.12	0.0-2.9	3.6-5.5	2.0-6.0	.20	.28	1
	5-16	5-20	1.45-1.60	2-6	0.04-0.09	0.0-2.9	3.6-5.5	0.0-1.0	.15	.24	
	16-80	---	---	---	0.00-0.01	---	---	---	---	---	
RsA:											
Rosman------------	0-10	8-18	1.25-1.40	2-6	0.12-0.18	0.0-2.9	5.1-6.5	4.0-8.0	.10	.10	5
	10-59	4-18	1.25-1.50	2-6	0.10-0.18	0.0-2.9	5.1-6.5	0.0-1.0	.28	.32	
	59-80	4-18	1.25-1.50	2-6	0.10-0.18	0.0-2.9	5.1-6.5	0.0-1.0	.28	.32	
SoD:											
Soco--------------	0-2	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	2.0-6.0	.24	.24	2
	2-33	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	0.0-1.0	.32	.32	
	33-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	

Table 18.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Soil reaction	Organic matter	Erosion factors		
									Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
SoD:											
Stecoah-----------	0-5	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	2.0-6.0	.24	.24	3
	5-47	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	0.0-1.0	.32	.32	
	47-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
SoE:											
Soco--------------	0-2	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	2.0-6.0	.24	.24	2
	2-33	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	0.0-1.0	.32	.32	
	33-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Stecoah-----------	0-5	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	2.0-6.0	.24	.24	3
	5-47	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	0.0-1.0	.32	.32	
	47-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
SoF:											
Soco--------------	0-2	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	2.0-6.0	.24	.24	2
	2-33	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	0.0-1.0	.32	.32	
	33-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Stecoah-----------	0-5	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	2.0-6.0	.24	.24	3
	5-47	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	0.0-1.0	.32	.32	
	47-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
StB:											
Statler-----------	0-10	10-27	1.35-1.45	0.6-2	0.18-0.22	0.0-2.9	5.1-7.3	4.0-10	.32	.32	5
	10-50	18-35	1.35-1.50	0.6-2	0.17-0.20	0.0-2.9	5.1-6.5	0.0-1.0	.24	.24	
	50-80	15-35	1.35-1.50	0.6-2	0.17-0.20	0.0-2.9	5.1-6.0	0.0-0.5	.24	.24	
SwD:											
Sylco-------------	0-6	15-25	1.00-1.20	2-6	0.11-0.16	0.0-2.9	3.6-5.5	2.0-6.0	.20	.28	2
	6-22	15-35	1.30-1.50	2-6	0.10-0.15	0.0-2.9	3.6-5.5	0.5-1.0	.20	.28	
	22-30	15-35	1.20-1.50	2-6	0.05-0.10	0.0-2.9	3.6-5.5	0.5-1.0	.15	.28	
	30-80	---	---	---	0.00-0.00	---	---	---	---	---	
Cataska-----------	0-6	12-22	1.30-1.40	2-20	0.10-0.14	0.0-2.9	3.6-5.5	2.0-6.0	.15	.28	1
	6-16	12-22	1.30-1.45	2-20	0.04-0.09	0.0-2.9	3.6-5.5	0.0-1.0	.15	.28	
	16-28	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
	28-80	---	---	---	0.00-0.00	---	---	---	---	---	
SwE:											
Sylco-------------	0-6	15-25	1.00-1.20	2-6	0.11-0.16	0.0-2.9	3.6-5.5	2.0-6.0	.20	.28	2
	6-22	15-35	1.30-1.50	2-6	0.10-0.15	0.0-2.9	3.6-5.5	0.5-1.0	.20	.28	
	22-30	15-35	1.20-1.50	2-6	0.05-0.10	0.0-2.9	3.6-5.5	0.5-1.0	.15	.28	
	30-80	---	---	---	0.00-0.00	---	---	---	---	---	
Cataska-----------	0-6	12-22	1.30-1.40	2-20	0.10-0.14	0.0-2.9	3.6-5.5	2.0-6.0	.15	.28	1
	6-16	12-22	1.30-1.45	2-20	0.04-0.09	0.0-2.9	3.6-5.5	0.0-1.0	.15	.28	
	16-28	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
	28-80	---	---	---	0.00-0.00	---	---	---	---	---	
SyD:											
Sylco-------------	0-5	5-18	1.35-1.60	2-6	0.12-0.18	0.0-2.9	3.6-5.5	2.0-6.0	.15	.24	2
	5-23	10-25	1.30-1.50	2-6	0.10-0.15	0.0-2.9	3.6-5.5	0.0-1.0	.10	.32	
	23-80	---	---	---	0.00-0.00	---	---	---	---	---	
Soco--------------	0-5	5-18	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.6-5.5	2.0-6.0	.15	.24	2
	5-24	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	0.0-1.0	.32	.32	
	24-35	5-18	1.40-1.65	2-6	0.09-0.15	0.0-2.9	3.6-5.5	0.0-0.5	.15	.24	
	35-80	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	

Table 18.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Soil reaction	Organic matter	Erosion factors		
									Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
SyE:											
Sylco	0-5	5-18	1.35-1.60	2-6	0.12-0.18	0.0-2.9	3.6-5.5	2.0-6.0	.15	.24	2
	5-23	10-25	1.30-1.50	2-6	0.10-0.15	0.0-2.9	3.6-5.5	0.0-1.0	.10	.32	
	23-80	---	---	---	0.00-0.00	---	---	---	---	---	
Soco	0-5	5-18	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.6-5.5	2.0-6.0	.15	.24	2
	5-24	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	0.0-1.0	.32	.32	
	24-35	5-18	1.40-1.65	2-6	0.09-0.15	0.0-2.9	3.6-5.5	0.0-1.0	.15	.24	
	35-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
SzF:											
Sylco	0-5	5-18	1.35-1.60	2-6	0.12-0.18	0.0-2.9	3.6-5.5	2.0-6.0	.15	.24	2
	5-23	10-25	1.30-1.50	2-6	0.10-0.15	0.0-2.9	3.6-5.5	0.0-1.0	.10	.32	
	23-80	---	---	---	0.00-0.00	---	---	---	---	---	
Soco	0-5	5-18	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.6-5.5	2.0-6.0	.15	.24	2
	5-24	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.6-5.5	0.0-1.0	.32	.32	
	24-35	5-18	1.40-1.65	2-6	0.09-0.15	0.0-2.9	3.6-5.5	0.0-1.0	.15	.24	
	35-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
TaB:											
Tate	0-7	5-25	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-6.0	.17	.24	5
	7-46	20-35	1.30-1.45	0.6-2	0.17-0.19	0.0-2.9	4.5-6.5	0.0-1.0	.28	.28	
	46-80	7-27	1.40-1.55	2-6	0.13-0.18	0.0-2.9	4.5-6.5	0.0-1.0	.17	.24	
TaC:											
Tate	0-7	5-25	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-6.0	.17	.24	5
	7-46	20-35	1.30-1.45	0.6-2	0.17-0.19	0.0-2.9	4.5-6.5	0.0-1.0	.28	.28	
	46-80	7-27	1.40-1.55	2-6	0.13-0.18	0.0-2.9	4.5-6.5	0.0-1.0	.17	.24	
TaD:											
Tate	0-7	5-25	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-6.0	.17	.24	5
	7-46	20-35	1.30-1.45	0.6-2	0.17-0.19	0.0-2.9	4.5-6.5	0.0-1.0	.28	.28	
	46-80	7-27	1.40-1.55	2-6	0.13-0.18	0.0-2.9	4.5-6.5	0.0-1.0	.17	.24	
TkC:											
Tate	0-7	5-25	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-6.0	.17	.24	5
	7-46	18-35	1.30-1.60	0.6-2	0.12-0.18	0.0-2.9	3.6-6.0	0.0-1.0	.24	.28	
	46-80	7-27	1.40-1.55	2-6	0.13-0.18	0.0-2.9	4.5-6.5	0.0-1.0	.17	.24	
TkD:											
Tate	0-7	5-25	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-6.0	.17	.24	5
	7-46	18-35	1.30-1.60	0.6-2	0.12-0.18	0.0-2.9	3.6-6.0	0.0-1.0	.24	.28	
	46-80	7-27	1.40-1.55	2-6	0.13-0.18	0.0-2.9	4.5-6.5	0.0-1.0	.17	.24	
TmC:											
Tate	0-7	5-25	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-6.0	.17	.24	5
	7-46	20-35	1.30-1.45	0.6-2	0.17-0.19	0.0-2.9	4.5-6.5	0.0-1.0	.28	.28	
	46-80	5-20	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	0.0-0.5	.17	.24	
Urban land.											
ToD:											
Toecaane	0-8	5-25	1.30-1.50	2-6	0.10-0.14	0.0-2.9	3.6-6.0	10-20	.10	.20	5
	8-24	10-30	1.40-1.60	2-6	0.08-0.12	0.0-2.9	3.6-6.0	0.0-1.0	.10	.20	
	24-30	5-20	1.40-1.60	2-6	0.06-0.10	0.0-2.9	3.6-6.0	0.0-0.5	.10	.20	
	30-80	5-20	1.45-1.65	2-6	0.04-0.08	0.0-2.9	3.6-6.0	0.0-0.5	.10	.24	

Table 18.—Physical and Chemical Properties of the Soils—Continued

									Erosion factors		
Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Soil reaction	Organic matter	Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
ToE:											
Toecane-----------	0-8	5-25	1.30-1.50	2-6	0.10-0.14	0.0-2.9	3.6-6.0	10-20	.10	.20	5
	8-24	10-30	1.40-1.60	2-6	0.08-0.12	0.0-2.9	3.6-6.0	0.0-1.0	.10	.20	
	24-30	5-20	1.40-1.60	2-6	0.06-0.10	0.0-2.9	3.6-6.0	0.0-1.0	.10	.20	
	30-80	5-20	1.45-1.65	2-6	0.04-0.08	0.0-2.9	3.6-6.0	0.0-0.5	.10	.24	
TrC:											
Toecane-----------	0-8	7-25	1.30-1.50	2-6	0.10-0.14	0.0-2.9	3.6-6.0	10-20	.10	.20	5
	8-24	10-30	1.40-1.60	2-6	0.08-0.12	0.0-2.9	3.6-6.0	0.0-1.0	.10	.20	
	24-30	5-20	1.40-1.60	2-6	0.06-0.10	0.0-2.9	3.6-6.0	0.0-1.0	.10	.20	
	30-80	5-20	1.45-1.65	2-6	0.04-0.08	0.0-2.9	3.6-6.0	0.0-0.5	.10	.24	
Tusquitee---------	0-8	5-20	1.20-1.40	2-6	0.12-0.17	0.0-2.9	4.5-6.5	10-20	.20	.24	5
	8-48	7-20	1.30-1.60	2-6	0.11-0.21	0.0-2.9	4.5-6.0	0.0-1.0	.20	.28	
	48-80	5-20	1.30-1.60	2-6	0.08-0.14	0.0-2.9	4.5-6.0	0.0-0.5	.17	.24	
TsD:											
Toecane-----------	0-8	7-25	1.30-1.50	2-6	0.10-0.14	0.0-2.9	3.6-6.0	10-20	.02	.02	5
	8-24	10-30	1.40-1.60	2-6	0.08-0.12	0.0-2.9	3.6-6.0	0.0-1.0	.05	.20	
	24-30	5-20	1.40-1.60	2-6	0.06-0.10	0.0-2.9	3.6-6.0	0.0-0.5	.05	.24	
	30-80	5-20	1.45-1.65	2-6	0.04-0.08	0.0-2.9	3.6-6.0	0.0-0.5	.02	.10	
Tusquitee---------	0-8	5-20	1.20-1.40	2-6	0.12-0.17	0.0-2.9	4.5-6.5	10-20	.02	.02	5
	8-48	7-20	1.30-1.60	2-6	0.11-0.21	0.0-2.9	4.5-6.0	0.0-1.0	.32	.43	
	48-80	5-20	1.30-1.60	2-6	0.08-0.14	0.0-2.9	4.5-6.0	0.0-0.5	.15	.28	
TsE:											
Toecane-----------	0-8	7-25	1.30-1.50	2-6	0.10-0.14	0.0-2.9	3.6-6.0	10-20	.10	.20	5
	8-24	10-30	1.40-1.60	2-6	0.08-0.12	0.0-2.9	3.6-6.0	0.0-1.0	.10	.20	
	24-30	5-20	1.40-1.60	2-6	0.06-0.10	0.0-2.9	3.6-6.0	0.0-0.5	.10	.20	
	30-80	5-20	1.45-1.65	2-6	0.04-0.08	0.0-2.9	3.6-6.0	0.0-0.5	.10	.24	
Tuaquitee---------	0-8	5-20	1.20-1.40	2-6	0.12-0.17	0.0-2.9	4.5-6.5	10-20	.20	.24	5
	8-48	7-20	1.30-1.60	2-6	0.11-0.21	0.0-2.9	4.5-6.0	0.0-1.0	.20	.28	
	48-80	5-20	1.30-1.60	2-6	0.08-0.14	0.0-2.9	4.5-6.0	0.0-0.5	.17	.24	
TuD:											
Tusquitee---------	0-8	5-20	1.20-1.40	2-6	0.12-0.17	0.0-2.9	4.5-6.5	10-20	.20	.24	5
	8-48	7-20	1.30-1.60	2-6	0.11-0.21	0.0-2.9	4.5-6.0	0.0-1.0	.20	.28	
	48-80	5-20	1.30-1.60	2-6	0.08-0.14	0.0-2.9	4.5-6.0	0.0-0.5	.17	.24	
Toecane-----------	0-8	7-25	1.30-1.50	2-6	0.10-0.14	0.0-2.9	3.6-6.0	10-20	.10	.20	5
	8-24	10-30	1.40-1.60	2-6	0.08-0.12	0.0-2.9	3.6-6.0	0.0-1.0	.10	.20	
	24-30	5-20	1.40-1.60	2-6	0.06-0.10	0.0-2.9	3.6-6.0	0.0-1.0	.10	.20	
	30-80	5-20	1.45-1.65	2-6	0.04-0.08	0.0-2.9	3.6-6.0	0.0-0.5	.10	.24	
TwB:											
Tusquitee---------	0-8	10-25	1.30-1.60	2-6	0.10-0.14	0.0-2.9	4.5-6.0	2.0-6.0	.24	.24	5
	8-48	7-20	1.30-1.60	2-6	0.11-0.21	0.0-2.9	4.5-6.0	0.0-1.0	.20	.28	
	48-80	5-20	1.30-1.60	2-6	0.08-0.14	0.0-2.9	4.5-6.0	0.0-0.5	.17	.24	
Whiteside---------	0-11	5-18	1.30-1.50	2-6	0.15-0.22	0.0-2.9	4.5-7.3	4.0-10	.24	.24	5
	11-37	18-27	1.35-1.55	0.6-2	0.14-0.20	0.0-2.9	4.5-6.0	0.0-1.0	.24	.24	
	37-80	8-35	1.35-1.60	0.6-6	0.10-0.16	0.0-2.9	4.5-6.0	0.0-0.5	.24	.24	
TwC:											
Tusquitee---------	0-8	10-25	1.30-1.60	2-6	0.10-0.14	0.0-2.9	4.5-6.0	2.0-6.0	.24	.24	5
	8-48	7-20	1.30-1.60	2-6	0.11-0.21	0.0-2.9	4.5-6.0	0.0-1.0	.20	.28	
	48-80	5-20	1.30-1.60	2-6	0.08-0.14	0.0-2.9	4.5-6.0	0.0-0.5	.17	.24	

Table 18.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Soil reaction	Organic matter	Erosion factors		
									Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
TwC:											
Whiteside---------	0-11	5-18	1.30-1.50	2-6	0.15-0.22	0.0-2.9	4.5-7.3	4.0-10	.24	.24	5
	11-37	18-27	1.35-1.55	0.6-2	0.14-0.20	0.0-2.9	4.5-6.0	0.0-1.0	.24	.24	
	37-80	8-35	1.35-1.60	0.6-6	0.10-0.16	0.0-2.9	4.5-6.0	0.0-0.5	.24	.24	
UcB:											
Udifluvents-------	0-80	0-4	1.20-1.70	6-20	0.06-0.10	0.0-2.9	5.1-7.8	0.0-0.5	.10	.10	5
Ud:											
Udorthents--------	0-80	4-40	1.30-1.65	0.00-20	0.10-0.17	0.0-2.9	4.5-7.8	0.0-0.5	.28	.28	5
UfB:											
Udorthents--------	0-80	4-20	1.30-1.65	0.00-20	0.10-0.17	0.0-2.9	4.5-7.8	0.0-0.5	.28	.28	5
Urban land.											
UhE:											
Udorthents--------	0-80	4-20	1.30-1.65	0.00-20	0.10-0.17	0.0-2.9	4.5-7.8	0.0-0.5	.28	.28	5
Urban land.											
UkE:											
Unaka-------------	0-9	10-22	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	6.0-14	.17	.20	2
	9-27	7-25	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	0.0-1.0	.17	.20	
	27-31	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
	31-80	---	---	---	0.00-0.01	---	---	---	---	---	
Rock outcrop.											
UkF:											
Unaka-------------	0-9	10-22	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	6.0-14	.17	.20	2
	9-27	7-25	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	0.0-1.0	.17	.20	
	27-31	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
	31-80	---	---	---	0.00-0.01	---	---	---	---	---	
Rock outcrop.											
UrD:											
Unicoi------------	0-5	5-20	1.45-1.55	2-6	0.08-0.12	0.0-2.9	3.6-5.5	2.0-6.0	.20	.28	1
	5-16	5-20	1.45-1.60	2-6	0.04-0.09	0.0-2.9	3.6-5.5	0.0-1.0	.15	.24	
	16-80	---	---	---	0.00-0.01	---	---	---	---	---	
Rock outcrop.											
UsB:											
Unison------------	0-10	10-25	1.35-1.65	0.6-6	0.14-0.20	0.0-2.9	4.5-6.0	2.0-6.0	.17	.24	5
	10-49	30-70	1.30-1.60	0.6-2	0.12-0.18	3.0-5.9	4.5-6.0	0.0-1.0	.15	.17	
	49-80	18-35	1.40-1.80	2-6	0.07-0.12	0.0-2.9	5.1-7.3	0.0-0.5	.17	.24	
UsC:											
Unison------------	0-10	10-25	1.35-1.65	0.6-6	0.14-0.20	0.0-2.9	4.5-6.0	2.0-6.0	.17	.24	5
	10-49	30-70	1.30-1.60	0.6-2	0.12-0.18	3.0-5.9	4.5-6.0	0.0-1.0	.15	.17	
	49-80	18-35	1.40-1.80	2-6	0.07-0.12	0.0-2.9	5.1-7.3	0.0-0.5	.17	.24	
UsD:											
Unison------------	0-10	10-25	1.35-1.65	0.6-6	0.14-0.20	0.0-2.9	4.5-6.0	2.0-6.0	.17	.24	5
	10-49	30-70	1.30-1.60	0.6-2	0.12-0.18	3.0-5.9	4.5-6.0	0.0-1.0	.15	.17	
	49-80	18-35	1.40-1.80	2-6	0.07-0.12	0.0-2.9	5.1-7.3	0.0-0.5	.17	.24	

Table 18.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Soil reaction	Organic matter	Erosion factors		
									Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
W.											
Water											
WaC2:											
Walnut------------	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	2
	2-21	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.24	.24	
	21-27	5-20	1.40-1.80	2-6	0.08-0.12	0.0-2.9	5.1-7.3	0.0-1.0	.15	.24	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Oteen-------------	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	1
	2-11	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.24	.24	
	11-15	5-20	1.40-1.80	2-6	0.07-0.12	0.0-2.9	5.1-7.3	0.0-0.5	.17	.24	
	15-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Mars Hill---------	0-3	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	3
	3-35	5-20	1.35-1.65	2-6	0.10-0.19	0.0-2.9	5.1-7.3	0.0-1.0	.24	.24	
	35-46	5-20	1.40-1.80	2-6	0.08-0.16	0.0-2.9	5.1-7.3	0.0-0.5	.20	.24	
	46-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
WaD2:											
Walnut------------	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	2
	2-21	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.24	.24	
	21-27	5-20	1.40-1.80	2-6	0.08-0.12	0.0-2.9	5.1-7.3	0.0-1.0	.15	.24	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Oteen-------------	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	1
	2-11	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.24	.24	
	11-15	5-20	1.40-1.80	2-6	0.07-0.12	0.0-2.9	5.1-7.3	0.0-0.5	.17	.24	
	15-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Mars Hill---------	0-3	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	3
	3-35	5-20	1.35-1.65	2-6	0.10-0.19	0.0-2.9	5.1-7.3	0.0-1.0	.24	.24	
	35-46	5-20	1.40-1.80	2-6	0.08-0.16	0.0-2.9	5.1-7.3	0.0-0.5	.20	.24	
	46-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
WaE2:											
Walnut------------	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	2
	2-21	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.24	.24	
	21-27	5-20	1.40-1.80	2-6	0.08-0.12	0.0-2.9	5.1-7.3	0.0-1.0	.15	.24	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Oteen-------------	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	1
	2-11	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.24	.24	
	11-15	5-20	1.40-1.80	2-6	0.07-0.12	0.0-2.9	5.1-7.3	0.0-0.5	.17	.24	
	15-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Mars Hill---------	0-3	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	3
	3-35	5-20	1.35-1.65	2-6	0.10-0.19	0.0-2.9	5.1-7.3	0.0-1.0	.24	.24	
	35-46	5-20	1.40-1.80	2-6	0.08-0.16	0.0-2.9	5.1-7.3	0.0-0.5	.20	.24	
	46-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
WoF:											
Walnut------------	0-3	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	2
	3-9	5-20	1.35-1.60	2-6	0.13-0.20	0.0-2.9	4.5-7.3	0.0-0.5	.24	.24	
	9-21	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.24	.24	
	21-27	5-20	1.40-1.80	2-6	0.08-0.12	0.0-2.9	5.1-7.3	0.0-1.0	.15	.24	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	

Table 18.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Soil reaction	Organic matter	Erosion factors		
									Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
WoF:											
Oteen-------------	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	1
	2-11	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.24	.24	
	11-15	5-20	1.40-1.80	2-6	0.07-0.12	0.0-2.9	5.1-7.3	0.0-0.5	.17	.24	
	15-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Rock outcrop.											
WrC:											
Wayah-------------	0-14	10-25	1.00-1.20	2-6	0.16-0.22	0.0-2.9	3.6-5.5	10-20	.24	.24	5
	14-48	10-25	1.20-1.60	2-6	0.09-0.13	0.0-2.9	3.6-6.0	0.0-1.0	.15	.24	
	48-80	3-15	1.40-1.65	2-6	0.05-0.09	0.0-2.9	3.6-6.0	0.0-0.5	.10	.24	
Burton------------	0-15	20-35	1.10-1.30	2-6	0.16-0.23	0.0-2.9	3.6-6.0	10-20	.24	.24	2
	15-24	5-18	1.35-1.60	2-6	0.10-0.15	0.0-2.9	3.6-6.0	0.0-1.0	.15	.24	
	24-27	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
	27-80	---	---	---	0.00-0.01	---	---	---	---	---	
WrD:											
Wayah-------------	0-14	10-25	1.00-1.20	2-6	0.16-0.22	0.0-2.9	3.6-5.5	10-20	.24	.24	5
	14-48	10-25	1.20-1.60	2-6	0.09-0.13	0.0-2.9	3.6-6.0	0.0-1.0	.15	.24	
	48-80	3-15	1.40-1.65	2-6	0.05-0.09	0.0-2.9	3.6-6.0	0.0-0.5	.10	.24	
Burton------------	0-15	20-35	1.10-1.30	2-6	0.16-0.23	0.0-2.9	3.6-6.0	10-20	.24	.24	2
	15-24	5-18	1.35-1.60	2-6	0.10-0.15	0.0-2.9	3.6-6.0	0.0-1.0	.15	.24	
	24-27	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
	27-80	---	---	---	0.00-0.01	---	---	---	---	---	
WrE:											
Wayah-------------	0-14	10-25	1.00-1.20	2-6	0.16-0.22	0.0-2.9	3.6-5.5	10-20	.24	.24	5
	14-48	10-25	1.20-1.60	2-6	0.09-0.13	0.0-2.9	3.6-6.0	0.0-1.0	.15	.24	
	48-80	3-15	1.40-1.65	2-6	0.05-0.09	0.0-2.9	3.6-6.0	0.0-0.5	.10	.24	
Burton------------	0-15	20-35	1.10-1.30	2-6	0.16-0.23	0.0-2.9	3.6-6.0	10-20	.24	.24	2
	15-24	5-18	1.35-1.60	2-6	0.10-0.15	0.0-2.9	3.6-6.0	0.0-1.0	.15	.24	
	24-27	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
	27-80	---	---	---	0.00-0.01	---	---	---	---	---	
WsF:											
Wayah-------------	0-14	10-25	1.00-1.20	2-6	0.16-0.22	0.0-2.9	3.6-5.5	10-20	.24	.24	5
	14-48	10-25	1.20-1.60	2-6	0.09-0.13	0.0-2.9	3.6-6.0	0.0-1.0	.15	.24	
	48-80	3-15	1.40-1.65	2-6	0.05-0.09	0.0-2.9	3.6-6.0	0.0-0.5	.10	.24	
Burton------------	0-15	20-35	1.10-1.30	2-6	0.16-0.23	0.0-2.9	3.6-6.0	10-20	.24	.24	2
	15-24	5-18	1.35-1.60	2-6	0.10-0.15	0.0-2.9	3.6-6.0	0.0-1.0	.15	.24	
	24-27	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
	27-80	---	---	---	0.00-0.01	---	---	---	---	---	
WtB:											
Whiteside---------	0-14	5-18	1.30-1.50	2-6	0.15-0.22	0.0-2.9	4.5-7.3	4.0-10	.24	.24	5
	14-47	18-27	1.35-1.55	0.6-2	0.14-0.20	0.0-2.9	4.5-6.0	0.0-1.0	.24	.24	
	47-53	3-20	1.40-1.60	2-6	0.04-0.11	0.0-2.9	4.5-6.0	0.0-0.5	.15	.15	
	53-80	8-35	1.35-1.60	0.6-6	0.10-0.16	0.0-2.9	4.5-6.0	0.0-0.5	.24	.24	

Table 19.--Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Restrictive layer			Soil slippage potential	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
AcD:						
Ashe	Lithic bedrock	20-40	Indurated	Low	Low	High
Cleveland	Lithic bedrock	10-20	Indurated	Low	Low	High
Rock outcrop	Lithic bedrock	0-0	Indurated	---	---	---
ArE:						
Ashe	Lithic bedrock	20-40	Indurated	Medium	Low	High
Cleveland	Lithic bedrock	10-20	Indurated	High	Low	High
Rock outcrop	Lithic bedrock	0-0	Indurated	---	---	---
ArF:						
Ashe	Lithic bedrock	20-40	Indurated	Medium	Low	High
Cleveland	Lithic bedrock	10-20	Indurated	High	Low	High
Rock outcrop	Lithic bedrock	0-0	Indurated	---	---	---
BaA:						
Biltmore	---	---	---	---	Low	Moderate
BkB2:						
Braddock	---	---	---	---	High	Moderate
BkC2:						
Braddock	---	---	---	---	High	Moderate
BkD2:						
Braddock	---	---	---	---	High	Moderate
BnD:						
Buladean	Paralithic bedrock	40-60	Moderately cemented	---	Low	High
Chestnut	Paralithic bedrock	20-40	Moderately cemented	---	Low	High

Table 19.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
BnE:						
Buladean	Paralithic bedrock	40-60	Moderately cemented	Low	Low	High
Chestnut	Paralithic bedrock	20-40	Moderately cemented	Low	Low	High
BnF:						
Buladean	Paralithic bedrock	40-60	Moderately cemented	Medium	Low	High
Chestnut	Paralithic bedrock	20-40	Moderately cemented	Medium	Low	High
CaD:						
Calvin	Paralithic bedrock	20-40	Moderately cemented	Low	Moderate	High
CaE:						
Calvin	Paralithic bedrock	20-40	Moderately cemented	Medium	Moderate	High
CaF:						
Calvin	Paralithic bedrock	20-40	Moderately cemented	Medium	Moderate	High
CfF:						
Cataska	Paralithic bedrock Lithic bedrock	10-20 20-40	Moderately cemented Very strongly cemented	High	Low	Moderate
Sylco	Lithic bedrock	20-40	Very strongly cemented	High	Low	Moderate
Rock outcrop	Lithic bedrock	0-0	Very strongly cemented	---	---	---
ChD:						
Cheoah	Paralithic bedrock	40-60	Moderately cemented	---	Low	High
Jeffrey	Lithic bedrock	20-40	Very strongly cemented	Low	Low	Moderate

Table 19.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
ChE:						
Cheoah	Paralithic bedrock	40-60	Moderately cemented	Low	Low	High
Jeffrey	Lithic bedrock	20-40	Very strongly cemented	Low	Low	Moderate
ChF:						
Cheoah	Paralithic bedrock	40-60	Moderately cemented	Medium	Low	High
Jeffrey	Lithic bedrock	20-40	Very strongly cemented	Medium	Low	Moderate
CsD:						
Chestoa	Lithic bedrock	20-40	Indurated	Low	High	Moderate
CsE:						
Chestoa	Lithic bedrock	20-40	Indurated	Low	High	Moderate
CsF:						
Chestoa	Lithic bedrock	20-40	Indurated	Medium	High	Moderate
CtB2:						
Clifton	---	---	---	---	Low	Moderate
CtC2:						
Clifton	---	---	---	---	Low	Moderate
CtD2:						
Clifton	---	---	---	---	Low	Moderate
CtE2:						
Clifton	---	---	---	Low	Low	Moderate
CxC:						
Clifton	---	---	---	---	Low	Moderate
Urban land.						
DeA:						
Dellwood	Strongly contrasting textural stratification	8-20	Noncemented	---	Low	Moderate

Table 19.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
DeA:						
Reddies	Strongly contrasting textural stratification	20-40	Noncemented	---	Low	Moderate
DrB:						
Dillard	---	---	---	---	Moderate	High
DtD:						
Ditney	Lithic bedrock	20-40	Indurated	---	Low	Moderate
Unicoi	Lithic bedrock	7-20	Indurated	---	Low	Moderate
DuE:						
Ditney	Lithic bedrock	20-40	Indurated	Medium	Low	Moderate
Unicoi	Lithic bedrock	7-20	Indurated	Medium	Low	Moderate
DuF:						
Ditney	Lithic bedrock	20-40	Indurated	Medium	Low	Moderate
Unicoi	Lithic bedrock	7-20	Indurated	High	Low	Moderate
EdD:						
Edneyville	---	---	---	---	Low	High
Chestnut	Paralithic bedrock	20-40	Moderately cemented	---	Low	High
EdE:						
Edneyville	---	---	---	Low	Low	High
Chestnut	Paralithic bedrock	20-40	Moderately cemented	Low	Low	High
EdF:						
Edneyville	---	---	---	Medium	Low	High
Chestnut	Paralithic bedrock	20-40	Moderately cemented	Medium	Low	High
EfA:						
Ela	Strongly contrasting textural stratification	20-40	Noncemented	---	High	High

Table 19.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
EvD2:						
Evard	---	---	---	---	Moderate	High
Cowee	Paralithic bedrock	20-40	Moderately cemented	---	Moderate	High
EvE2:						
Evard	---	---	---	Low	Moderate	High
Cowee	Paralithic bedrock	20-40	Moderately cemented	Low	Moderate	High
EvF2:						
Evard	---	---	---	Medium	Moderate	High
Cowee	Paralithic bedrock	20-40	Moderately cemented	Medium	Moderate	High
EwD:						
Evard	---	---	---	---	Moderate	High
Cowee	Paralithic bedrock	20-40	Moderately cemented	---	Moderate	High
EwE:						
Evard	---	---	---	Low	Moderate	High
Cowee	Paralithic bedrock	20-40	Moderately cemented	Low	Moderate	High
EwF:						
Evard	---	---	---	Medium	Moderate	High
Cowee	Paralithic bedrock	20-40	Moderately cemented	Medium	Moderate	High
FnD2:						
Fannin	---	---	---	Low	Moderate	Moderate
FrA:						
French	Strongly contrasting textural stratification	20-40	Noncemented	---	Moderate	Moderate
HcE:						
Heintooga	---	---	---	Medium	High	High
Chiltoskie	---	---	---	Low	High	High

Table 19.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
HpA:						
Hemphill	---	---	---	---	High	High
JbD:						
Junaluska	Paralithic bedrock	20-40	Moderately cemented	---	Moderate	High
Brasstown	Paralithic bedrock	40-60	Moderately cemented	---	Moderate	High
JbE:						
Junaluska	Paralithic bedrock	20-40	Moderately cemented	Low	Moderate	High
Brasstown	Paralithic bedrock	40-60	Moderately cemented	Low	Moderate	High
JbF:						
Junaluska	Paralithic bedrock	20-40	Moderately cemented	Medium	Moderate	High
Brasstown	Paralithic bedrock	40-60	Moderately cemented	Medium	Moderate	High
KnC:						
Keener	---	---	---	---	Moderate	Moderate
MwC:						
Mars Hill	Paralithic bedrock	40-60	Moderately cemented	---	Low	Moderate
Walnut	Paralithic bedrock	20-40	Moderately cemented	---	Low	Moderate
MwD:						
Mars Hill	Paralithic bedrock	40-60	Moderately cemented	---	Low	Moderate
Walnut	Paralithic bedrock	20-40	Moderately cemented	---	Low	Moderate
MwE:						
Mars Hill	Paralithic bedrock	40-60	Moderately cemented	Low	Low	Moderate
Walnut	Paralithic bedrock	20-40	Moderately cemented	Low	Low	Moderate

Table 19.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
MwF:						
Mars Hill----------------------	Paralithic bedrock	40-60	Moderately cemented	Medium	Low	Moderate
Walnut-------------------------	Paralithic bedrock	20-40	Moderately cemented	Medium	Low	Moderate
MyB:						
Maymead------------------------	---	---	---	---	Low	Moderate
Northcove----------------------	---	---	---	---	Low	High
NhC:						
Northcove----------------------	---	---	---	---	Low	High
Maymead------------------------	---	---	---	---	Low	Moderate
NtD:						
Northcove----------------------	---	---	---	---	Low	High
Maymead------------------------	---	---	---	---	Low	Moderate
NtE:						
Northcove----------------------	---	---	---	Medium	Low	High
Maymead------------------------	---	---	---	Low	Low	Moderate
OwC:						
Oconaluftee--------------------	---	---	---	---	Low	High
Guyot--------------------------	Paralithic bedrock	40-60	Moderately cemented	---	High	High
Cataloochee--------------------	Paralithic bedrock	20-40	Moderately cemented	---	High	High
OwD:						
Oconaluftee--------------------	---	---	---	---	Low	High
Guyot--------------------------	Paralithic bedrock	40-60	Moderately cemented	---	High	High
Cataloochee--------------------	Paralithic bedrock	20-40	Moderately cemented	---	High	High

Table 19.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
OwE:						
Oconaluftee------------------	---	---	---	Low	Low	High
Guyot------------------------	Paralithic bedrock	40-60	Moderately cemented	Low	High	High
Cataloochee------------------	Paralithic bedrock	20-40	Moderately cemented	Low	High	High
OwF:						
Oconaluftee------------------	---	---	---	Medium	Low	High
Guyot------------------------	Paralithic bedrock	40-60	Moderately cemented	Medium	High	High
Cataloochee------------------	Paralithic bedrock	20-40	Moderately cemented	Medium	High	High
PwC:						
Porters----------------------	Lithic bedrock	40-60	Very strongly cemented	---	Low	High
Unaka------------------------	Paralithic bedrock	20-35	Moderately cemented	---	Low	Moderate
	Lithic bedrock	20-40	Very strongly cemented			
PwD:						
Porters----------------------	Lithic bedrock	40-60	Very strongly cemented	---	Low	High
Unaka------------------------	Paralithic bedrock	20-35	Moderately cemented	Low	Low	Moderate
	Lithic bedrock	20-40	Very strongly cemented			
PwE:						
Porters----------------------	Lithic bedrock	40-60	Very strongly cemented	Low	Low	High
Unaka------------------------	Paralithic bedrock	20-35	Moderately cemented	Low	Low	Moderate
	Lithic bedrock	20-40	Very strongly cemented			

Table 19.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
PxF:						
Porters----------------------	Lithic bedrock	40-60	Very strongly cemented	Medium	Low	High
Unaka------------------------	Paralithic bedrock	20-35	Moderately cemented	Medium	Low	Moderate
	Lithic bedrock	20-40	Very strongly cemented			
RbA:						
Reddies----------------------	Strongly contrasting textural stratification	20-40	Noncemented	---	Low	Moderate
RcF:						
Rock outcrop-----------------	Lithic bedrock	0-0	Very strongly cemented	---	---	---
Cataska----------------------	Paralithic bedrock	10-20	Moderately cemented	High	Low	Moderate
	Lithic bedrock	20-40	Very strongly cemented			
RhD:						
Rock outcrop-----------------	Lithic bedrock	0-0	Indurated	---	---	---
Chestoa----------------------	Lithic bedrock	20-40	Indurated	Low	High	Moderate
RhF:						
Rock outcrop-----------------	Lithic bedrock	0-0	Indurated	---	---	---
Chestoa----------------------	Lithic bedrock	20-40	Indurated	High	High	Moderate
RkF:						
Rock outcrop-----------------	Lithic bedrock	0-0	Indurated	---	---	---
Cleveland--------------------	Lithic bedrock	10-20	Indurated	Low	Low	High
RoF:						
Rock outcrop-----------------	Lithic bedrock	0-0	Indurated	---	---	---
Oteen------------------------	Paralithic bedrock	10-20	Moderately cemented	High	Low	Moderate
RpF:						
Rock outcrop-----------------	Lithic bedrock	0-0	Indurated	---	---	---
Unicoi-----------------------	Lithic bedrock	7-20	Indurated	High	Low	Moderate

Table 19.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
RsA:						
Rosman------------------------	---	---	---	---	Moderate	Moderate
SoD:						
Soco--------------------------	Paralithic bedrock	20-40	Moderately cemented	---	Moderate	High
Stecoah-----------------------	Paralithic bedrock	40-60	Moderately cemented	---	Moderate	High
SoE:						
Soco--------------------------	Paralithic bedrock	20-40	Moderately cemented	Low	Moderate	High
Stecoah-----------------------	Paralithic bedrock	40-60	Moderately cemented	Low	Moderate	High
SoF:						
Soco--------------------------	Paralithic bedrock	20-40	Moderately cemented	Medium	Moderate	High
Stecoah-----------------------	Paralithic bedrock	40-60	Moderately cemented	Medium	Moderate	High
StB:						
Statler-----------------------	---	---	---	---	Low	Moderate
SwD:						
Sylco-------------------------	Lithic bedrock	20-40	Very strongly cemented	Low	Low	Moderate
Cataska-----------------------	Paralithic bedrock Lithic bedrock	10-20 20-40	Moderately cemented Very strongly cemented	Low	Low	Moderate
SwE:						
Sylco-------------------------	Lithic bedrock	20-40	Very strongly cemented	Medium	Low	Moderate
Cataska-----------------------	Paralithic bedrock Lithic bedrock	10-20 20-40	Moderately cemented Very strongly cemented	Medium	Low	Moderate
SyD:						
Sylco-------------------------	Lithic bedrock	20-40	Very strongly cemented	Low	Low	Moderate

Table 19.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
SyD:						
Soco------------------------	Paralithic bedrock	20-40	Moderately cemented	---	Moderate	High
SyE:						
Sylco-----------------------	Lithic bedrock	20-40	Very strongly cemented	Medium	Low	Moderate
Soco------------------------	Paralithic bedrock	20-40	Moderately cemented	Low	Moderate	High
SzF:						
Sylco-----------------------	Lithic bedrock	20-40	Very strongly cemented	High	Low	Moderate
Soco------------------------	Paralithic bedrock	20-40	Moderately cemented	Medium	Moderate	High
TaB:						
Tate------------------------	---	---	---	---	Moderate	Moderate
TaC:						
Tate------------------------	---	---	---	---	Moderate	Moderate
TaD:						
Tate------------------------	---	---	---	---	Moderate	Moderate
TkC:						
Tate------------------------	---	---	---	---	Moderate	Moderate
TkD:						
Tate------------------------	---	---	---	---	Moderate	Moderate
TmC:						
Tate------------------------	---	---	---	---	Moderate	Moderate
Urban land.						
ToD:						
Toecane---------------------	---	---	---	---	Low	High
ToE:						
Toecane---------------------	---	---	---	Medium	Low	High
TrC:						
Toecane---------------------	---	---	---	---	High	High
Tusquitee-------------------	---	---	---	---	Moderate	Moderate

Table 19.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
TsD:						
Toecane----------------------	---	---	---	---	High	High
Tusquitee--------------------	---	---	---	---	Moderate	Moderate
TsE:						
Toecane----------------------	---	---	---	Medium	High	High
Tusquitee--------------------	---	---	---	Low	Moderate	Moderate
TuD:						
Tusquitee--------------------	---	---	---	---	Moderate	Moderate
Toecane----------------------	---	---	---	---	Low	High
TwB:						
Tusquitee--------------------	---	---	---	---	Moderate	Moderate
Whiteside--------------------	---	---	---	---	Moderate	High
TwC:						
Tusquitee--------------------	---	---	---	---	Moderate	Moderate
Whiteside--------------------	---	---	---	---	Moderate	High
UcB:						
Udifluvents------------------	---	---	---	---	---	---
Ud:						
Udorthents-------------------	---	---	---	---	Moderate	High
UfB:						
Udorthents-------------------	---	---	---	---	Moderate	High
Urban land.						
UhE:						
Udorthents-------------------	---	---	---	Medium	---	---
Urban land.						
UkE:						
Unaka------------------------	Paralithic bedrock Lithic bedrock	20-35 20-40	Moderately cemented Indurated	Medium	Low	Moderate
Rock outcrop-----------------	Lithic bedrock	0-0	Indurated	---	---	---

Table 19.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
UkF:						
Unaka	Paralithic bedrock	20-35	Moderately cemented	High	Low	Moderate
	Lithic bedrock	20-40	Indurated			
Rock outcrop	Lithic bedrock	0-0	Indurated	---	---	---
UrD:						
Unicoi	Lithic bedrock	7-20	Indurated	Low	Low	Moderate
Rock outcrop	Lithic bedrock	0-0	Indurated	---	---	---
UsB:						
Unison	---	---	---	---	High	Moderate
UsC:						
Unison	---	---	---	---	High	Moderate
UsD:						
Unison	---	---	---	---	High	Moderate
W.						
Water						
WaC2:						
Walnut	Paralithic bedrock	20-40	Moderately cemented	---	Low	Moderate
Oteen	Paralithic bedrock	10-20	Moderately cemented	---	Low	Moderate
Mars Hill	Paralithic bedrock	40-60	Moderately cemented	---	Low	Moderate
WaD2:						
Walnut	Paralithic bedrock	20-40	Moderately cemented	---	Low	Moderate
Oteen	Paralithic bedrock	10-20	Moderately cemented	---	Low	Moderate
Mars Hill	Paralithic bedrock	40-60	Moderately cemented	---	Low	Moderate

Table 19.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	Risk of corrosion	
	Kind	Depth to top	Hardness		Uncoated steel	Concrete
		In				
WaE2:						
Walnut----------------------	Paralithic bedrock	20-40	Moderately cemented	Low	Low	Moderate
Oteen-----------------------	Paralithic bedrock	10-20	Moderately cemented	Low	Low	Moderate
Mars Hill-------------------	Paralithic bedrock	40-60	Moderately cemented	Low	Low	Moderate
WoF:						
Walnut----------------------	Paralithic bedrock	20-40	Moderately cemented	Medium	Low	Moderate
Oteen-----------------------	Paralithic bedrock	10-20	Moderately cemented	High	Low	Moderate
Rock outcrop----------------	Lithic bedrock	0-0	Indurated	---	---	---
WrC:						
Wayah-----------------------	---	---	---	---	Low	High
Burton----------------------	Lithic bedrock	20-40	Indurated	---	High	High
WrD:						
Wayah-----------------------	---	---	---	---	Low	High
Burton----------------------	Lithic bedrock	20-40	Indurated	---	High	High
WrE:						
Wayah-----------------------	---	---	---	Low	Low	High
Burton----------------------	Lithic bedrock	20-40	Indurated	Low	High	High
WsF:						
Wayah-----------------------	---	---	---	Medium	Low	High
Burton----------------------	Lithic bedrock	20-40	Indurated	Medium	High	High
WtB:						
Whiteside-------------------	---	---	---	---	Moderate	High

Table 20.—Water Features

(Depths of layers are in feet. See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

			Water table		Ponding			Flooding	
Map symbol and soil name	Hydrologic group	Months	Upper limit	Kind	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft		Ft				
AcD:									
Ashe------------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Cleveland-------	C	Jan-Dec	>6.0	---	---	---	None	---	None
Rock outcrop----	D	Jan-Dec	>6.0	---	---	---	None	---	None
ArE:									
Ashe------------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Cleveland-------	C	Jan-Dec	>6.0	---	---	---	None	---	None
Rock outcrop----	D	Jan-Dec	>6.0	---	---	---	None	---	None
ArF:									
Ashe------------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Cleveland-------	C	Jan-Dec	>6.0	---	---	---	None	---	None
Rock outcrop----	D	Jan-Dec	>6.0	---	---	---	None	---	None
BaA:									
Biltmore--------	A	Jan-May	3.5-6.0	Apparent	---	---	None	Very brief	Occasional
		Jun-Nov	4.0-6.5	Apparent	---	---	None	---	---
		Dec	3.5-6.0	Apparent	---	---	None	Very brief	Occasional
BkB2:									
Braddock--------	B	Jan-Dec	>6.0	---	---	---	None	---	None
BkC2:									
Braddock--------	B	Jan-Dec	>6.0	---	---	---	None	---	None
BkD2:									
Braddock--------	B	Jan-Dec	>6.0	---	---	---	None	---	None
BnD:									
Buladean--------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Chestnut--------	B	Jan-Dec	>6.0	---	---	---	None	---	None
BnE:									
Buladean--------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Chestnut--------	B	Jan-Dec	>6.0	---	---	---	None	---	None
BnF:									
Buladean--------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Chestnut--------	B	Jan-Dec	>6.0	---	---	---	None	---	None
CaD:									
Calvin----------	C	Jan-Dec	>6.0	---	---	---	None	---	None
CaE:									
Calvin----------	C	Jan-Dec	>6.0	---	---	---	None	---	None

Table 20.—Water Features—Continued

Map symbol and soil name	Hydro-logic group	Months	Water table		Ponding			Flooding	
			Upper limit	Kind	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft		Ft				
CaF:									
Calvin----------	C	Jan-Dec	>6.0	---	---	---	None	---	None
CfF:									
Cataska---------	D	Jan-Dec	>6.0	---	---	---	None	---	None
Sylco-----------	C	Jan-Dec	>6.0	---	---	---	None	---	None
Rock outcrop----	D	Jan-Dec	>6.0	---	---	---	None	---	None
ChD:									
Cheoah----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Jeffrey---------	B	Jan-Dec	>6.0	---	---	---	None	---	None
ChE:									
Cheoah----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Jeffrey---------	B	Jan-Dec	>6.0	---	---	---	None	---	None
ChF:									
Cheoah----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Jeffrey---------	B	Jan-Dec	>6.0	---	---	---	None	---	None
CsD:									
Chestoa---------	B	Jan-Dec	>6.0	---	---	---	None	---	None
CsE:									
Chestoa---------	B	Jan-Dec	>6.0	---	---	---	None	---	None
CsF:									
Chestoa---------	B	Jan-Dec	>6.0	---	---	---	None	---	None
CtB2:									
Clifton---------	B	Jan-Dec	>6.0	---	---	---	None	---	None
CtC2:									
Clifton---------	B	Jan-Dec	>6.0	---	---	---	None	---	None
CtD2:									
Clifton---------	B	Jan-Dec	>6.0	---	---	---	None	---	None
CtE2:									
Clifton---------	B	Jan-Dec	>6.0	---	---	---	None	---	None
CxC:									
Clifton---------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Urban land.									
DeA:									
Dellwood--------	A	Jan-May	2.0-4.0	Apparent	---	---	None	Very brief	Occasional
		Jun-Nov	2.5-4.5	Apparent	---	---	None	---	---
		Dec	2.0-4.0	Apparent	---	---	None	Very brief	Occasional
Reddies---------	B	Jan-May	2.0-3.5	Apparent	---	---	None	Very brief	Occasional
		Jun-Nov	2.5-4.0	Apparent	---	---	None	---	---
		Dec	2.0-3.5	Apparent	---	---	None	Very brief	Occasional

Table 20.—Water Features—Continued

Map symbol and soil name	Hydro-logic group	Months	Water table		Ponding			Flooding	
			Upper limit	Kind	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft		Ft				
DrB:									
Dillard---------	C	Jan-May	2.0-3.0	Apparent	---	---	None	---	Rare
		Jun-Nov	2.5-3.5	Apparent	---	---	None	---	Rare
		Dec	2.0-3.0	Apparent	---	---	None	---	Rare
DtD:									
Ditney----------	C	Jan-Dec	>6.0	---	---	---	None	---	None
Unicoi----------	C	Jan-Dec	>6.0	---	---	---	None	---	None
DuE:									
Ditney----------	C	Jan-Dec	>6.0	---	---	---	None	---	None
Unicoi----------	C	Jan-Dec	>6.0	---	---	---	None	---	None
DuF:									
Ditney----------	C	Jan-Dec	>6.0	---	---	---	None	---	None
Unicoi----------	C	Jan-Dec	>6.0	---	---	---	None	---	None
EdD:									
Edneyville------	A	Jan-Dec	>6.0	---	---	---	None	---	None
Chestnut--------	B	Jan-Dec	>6.0	---	---	---	None	---	None
EdE:									
Edneyville------	A	Jan-Dec	>6.0	---	---	---	None	---	None
Chestnut--------	B	Jan-Dec	>6.0	---	---	---	None	---	None
EdF:									
Edneyville------	A	Jan-Dec	>6.0	---	---	---	None	---	None
Chestnut--------	B	Jan-Dec	>6.0	---	---	---	None	---	None
EfA:									
Ela, drained----	B/D	Jan-May	0.0-1.0	Apparent	0.0-0.5	Brief	Occasional	Very brief	Frequent
		Jun-Nov	0.5-1.5	Apparent	0.0-0.5	Brief	Occasional	---	---
		Dec	0.0-1.0	Apparent	0.0-0.5	Brief	Occasional	Very brief	Frequent
Ela, undrained--	B/D	Jan-May	0.0-1.0	Apparent	0.0-0.5	Brief	Occasional	Very brief	Frequent
		Jun-Nov	0.5-1.5	Apparent	0.0-0.5	Brief	Occasional	---	---
		Dec	0.0-1.0	Apparent	0.0-0.5	Brief	Occasional	Very brief	Frequent
EvD2:									
Evard-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Cowee-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
EvE2:									
Evard-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Cowee-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
EvF2:									
Evard-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Cowee-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None

Table 20.—Water Features—Continued

Map symbol and soil name	Hydro-logic group	Months	Water table		Ponding			Flooding	
			Upper limit	Kind	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft		Ft				
EwD:									
Evard-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Cowee-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
EwE:									
Evard-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Cowee-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
EwF:									
Evard-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Cowee-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
FnD2:									
Fannin----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
FrA:									
French----------	C	Jan-May	1.0-2.5	Apparent	---	---	None	Very brief	Occasional
		Jun-Nov	2.0-3.5	Apparent	---	---	None	---	---
		Dec	1.0-2.5	Apparent	---	---	None	Very brief	Occasional
HcE:									
Heintooga-------	A	Jan-Dec	>6.0	---	---	---	None	---	None
Chiltoskie------	B	Jan-Dec	>6.0	---	---	---	None	---	None
HpA:									
Hemphill, drained--------	D	Jan-May	0.0-1.0	Apparent	---	---	None	---	Rare
		Jun-Nov	0.5-1.5	Apparent	---	---	None	---	Rare
		Dec	0.0-1.0	Apparent	---	---	None	---	Rare
Hemphill, undrained------	D	Jan-May	0.0-1.0	Apparent	0.0-0.5	Brief	Occasional	---	Rare
		Jun-Nov	0.5-1.5	Apparent	0.0-0.5	Brief	Occasional	---	Rare
		Dec	0.0-1.0	Apparent	0.0-0.5	Brief	Occasional	---	Rare
JbD:									
Junaluska-------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Brasstown-------	B	Jan-Dec	>6.0	---	---	---	None	---	None
JbE:									
Junaluska-------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Brasstown-------	B	Jan-Dec	>6.0	---	---	---	None	---	None
JbF:									
Junaluska-------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Brasstown-------	B	Jan-Dec	>6.0	---	---	---	None	---	None
KnC:									
Keener----------	B	Jan-Dec	>6.0	---	---	---	None	---	None

Table 20.—Water Features—Continued

Map symbol and soil name	Hydro-logic group	Months	Water table		Ponding			Flooding	
			Upper limit	Kind	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft		Ft				
MwC:									
Mars Hill-------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Walnut----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
MwD:									
Mars Hill-------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Walnut----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
MwE:									
Mars Hill-------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Walnut----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
MwF:									
Mars Hill-------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Walnut----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
MyB:									
Maymead---------	A	Jan-Dec	>6.0	---	---	---	None	---	None
Northcove-------	A	Jan-Dec	>6.0	---	---	---	None	---	None
NhC:									
Northcove-------	A	Jan-Dec	>6.0	---	---	---	None	---	None
Maymead---------	A	Jan-Dec	>6.0	---	---	---	None	---	None
NtD:									
Northcove-------	A	Jan-Dec	>6.0	---	---	---	None	---	None
Maymead---------	A	Jan-Dec	>6.0	---	---	---	None	---	None
NtE:									
Northcove-------	A	Jan-Dec	>6.0	---	---	---	None	---	None
Maymead---------	A	Jan-Dec	>6.0	---	---	---	None	---	None
OwC:									
Oconaluftee-----	A	Jan-Dec	>6.0	---	---	---	None	---	None
Guyot-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Cataloochee-----	B	Jan-Dec	>6.0	---	---	---	None	---	None
OwD:									
Oconaluftee-----	A	Jan-Dec	>6.0	---	---	---	None	---	None
Guyot-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Cataloochee-----	B	Jan-Dec	>6.0	---	---	---	None	---	None
OwE:									
Oconaluftee-----	A	Jan-Dec	>6.0	---	---	---	None	---	None
Guyot-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None

Table 20.—Water Features—Continued

Map symbol and soil name	Hydro-logic group	Months	Water table		Ponding			Flooding	
			Upper limit	Kind	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft		*Ft*				
OwE:									
Cataloochee-----	B	Jan-Dec	>6.0	---	---	---	None	---	None
OwF:									
Oconaluftee-----	A	Jan-Dec	>6.0	---	---	---	None	---	None
Guyot-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Cataloochee-----	B	Jan-Dec	>6.0	---	---	---	None	---	None
PwC:									
Porters---------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Unaka-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
PwD:									
Porters---------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Unaka-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
PwE:									
Porters---------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Unaka-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
PxF:									
Porters---------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Unaka-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
RbA:									
Reddies---------	B	Jan-May	2.0-3.5	Apparent	---	---	None	Very brief	Occasional
		Jun-Nov	2.5-4.0	Apparent	---	---	None	---	---
		Dec	2.0-3.5	Apparent	---	---	None	Very brief	Occasional
RcF:									
Rock outcrop----	D	Jan-Dec	>6.0	---	---	---	None	---	None
Cataska---------	D	Jan-Dec	>6.0	---	---	---	None	---	None
RhD:									
Rock outcrop----	D	Jan-Dec	>6.0	---	---	---	None	---	None
Chestoa---------	B	Jan-Dec	>6.0	---	---	---	None	---	None
RhF:									
Rock outcrop----	D	Jan-Dec	>6.0	---	---	---	None	---	None
Chestoa---------	B	Jan-Dec	>6.0	---	---	---	None	---	None
RkF:									
Rock outcrop----	D	Jan-Dec	>6.0	---	---	---	None	---	None
Cleveland-------	C	Jan-Dec	>6.0	---	---	---	None	---	None
RoF:									
Rock outcrop----	D	Jan-Dec	>6.0	---	---	---	None	---	None
Oteen-----------	C	Jan-Dec	>6.0	---	---	---	None	---	None

Table 20.—Water Features—Continued

Map symbol and soil name	Hydrologic group	Months	Water table		Ponding			Flooding	
			Upper limit	Kind	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft		Ft				
RpF:									
Rock outcrop	D	Jan-Dec	>6.0	---	---	---	None	---	None
Unicoi	C	Jan-Dec	>6.0	---	---	---	None	---	None
RsA:									
Rosman	A	Jan-May	3.5-5.0	Apparent	---	---	None	Very brief	Occasional
		Jun-Nov	3.5-5.0	Apparent	---	---	None	---	---
		Dec	3.5-5.0	Apparent	---	---	None	Very brief	Occasional
SoD:									
Soco	B	Jan-Dec	>6.0	---	---	---	None	---	None
Stecoah	B	Jan-Dec	>6.0	---	---	---	None	---	None
SoE:									
Soco	B	Jan-Dec	>6.0	---	---	---	None	---	None
Stecoah	B	Jan-Dec	>6.0	---	---	---	None	---	None
SoF:									
Soco	B	Jan-Dec	>6.0	---	---	---	None	---	None
Stecoah	B	Jan-Dec	>6.0	---	---	---	None	---	None
StB:									
Statler	B	Jan-Dec	4.0-6.0	Apparent	---	---	None	---	Rare
SwD:									
Sylco	C	Jan-Dec	>6.0	---	---	---	None	---	None
Cataska	D	Jan-Dec	>6.0	---	---	---	None	---	None
SwE:									
Sylco	C	Jan-Dec	>6.0	---	---	---	None	---	None
Cataska	D	Jan-Dec	>6.0	---	---	---	None	---	None
SyD:									
Sylco	C	Jan-Dec	>6.0	---	---	---	None	---	None
Soco	B	Jan-Dec	>6.0	---	---	---	None	---	None
SyE:									
Sylco	C	Jan-Dec	>6.0	---	---	---	None	---	None
Soco	B	Jan-Dec	>6.0	---	---	---	None	---	None
SzF:									
Sylco	C	Jan-Dec	>6.0	---	---	---	None	---	None
Soco	B	Jan-Dec	>6.0	---	---	---	None	---	None
TaB:									
Tate	B	Jan-Dec	>6.0	---	---	---	None	---	None
TaC:									
Tate	B	Jan-Dec	>6.0	---	---	---	None	---	None

Table 20.—Water Features—Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft		*Ft*				
TaD:									
Tate------------	B	Jan-Dec	>6.0	---	---	---	None	---	None
TkC:									
Tate------------	B	Jan-Dec	>6.0	---	---	---	None	---	None
TkD:									
Tate------------	B	Jan-Dec	>6.0	---	---	---	None	---	None
TmC:									
Tate------------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Urban land.									
ToD:									
Toecane---------	A	Jan-Dec	>6.0	---	---	---	None	---	None
ToE:									
Toecane---------	A	Jan-Dec	>6.0	---	---	---	None	---	None
TrC:									
Toecane---------	A	Jan-Dec	>6.0	---	---	---	None	---	None
Tusquitee-------	B	Jan-Dec	>6.0	---	---	---	None	---	None
TsD:									
Toecane---------	A	Jan-Dec	>6.0	---	---	---	None	---	None
Tusquitee-------	B	Jan-Dec	>6.0	---	---	---	None	---	None
TsE:									
Toecane---------	A	Jan-Dec	>6.0	---	---	---	None	---	None
Tusquitee-------	B	Jan-Dec	>6.0	---	---	---	None	---	None
TuD:									
Tusquitee-------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Toecane---------	A	Jan-Dec	>6.0	---	---	---	None	---	None
TwB:									
Tusquitee-------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Whiteside-------	B	Jan-May	2.0-3.0	Apparent	---	---	None	---	None
		Jun-Nov	2.0-3.5	Apparent	---	---	None	---	None
		Dec	2.0-3.0	Apparent	---	---	None	---	None
TwC:									
Tusquitee-------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Whiteside-------	B	Jan-May	2.0-3.0	Apparent	---	---	None	---	None
		Jun-Nov	2.0-3.5	Apparent	---	---	None	---	None
		Dec	2.0-3.0	Apparent	---	---	None	---	None
UcB:									
Udifluvents-----	A	Jan-Dec	3.5-5.0	Apparent	---	---	None	Very brief	Frequent
Ud:									
Udorthents------	B	Jan-Dec	>6.0	---	---	---	None	---	None

Table 20.—Water Features—Continued

Map symbol and soil name	Hydro-logic group	Months	Water table		Ponding			Flooding	
			Upper limit	Kind	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft		*Ft*				
UfB:									
Udorthents	B	Jan-Dec	>6.0	---	---	---	None	Very brief	Occasional
Urban land.									
UhE:									
Udorthents	B	Jan-Dec	>6.0	---	---	---	None	---	None
Urban land.									
UkE:									
Unaka	B	Jan-Dec	>6.0	---	---	---	None	---	None
Rock outcrop	D	Jan-Dec	>6.0	---	---	---	None	---	None
UkF:									
Unaka	B	Jan-Dec	>6.0	---	---	---	None	---	None
Rock outcrop	D	Jan-Dec	>6.0	---	---	---	None	---	None
UrD:									
Unicoi	C	Jan-Dec	>6.0	---	---	---	None	---	None
Rock outcrop	D	Jan-Dec	>6.0	---	---	---	None	---	None
UsB:									
Unison	B	Jan-Dec	>6.0	---	---	---	None	---	None
UsC:									
Unison	B	Jan-Dec	>6.0	---	---	---	None	---	None
UsD:									
Unison	B	Jan-Dec	>6.0	---	---	---	None	---	None
WaC2:									
Walnut	B	Jan-Dec	>6.0	---	---	---	None	---	None
Oteen	C	Jan-Dec	>6.0	---	---	---	None	---	None
Mars Hill	B	Jan-Dec	>6.0	---	---	---	None	---	None
WaD2:									
Walnut	B	Jan-Dec	>6.0	---	---	---	None	---	None
Oteen	C	Jan-Dec	>6.0	---	---	---	None	---	None
Mars Hill	B	Jan-Dec	>6.0	---	---	---	None	---	None
WaE2:									
Walnut	B	Jan-Dec	>6.0	---	---	---	None	---	None
Oteen	C	Jan-Dec	>6.0	---	---	---	None	---	None
Mars Hill	B	Jan-Dec	>6.0	---	---	---	None	---	None

Table 20.—Water Features—Continued

Map symbol and soil name	Hydro-logic group	Months	Water table		Ponding			Flooding	
			Upper limit	Kind	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft		Ft				
WoF:									
Walnut----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Oteen-----------	C	Jan-Dec	>6.0	---	---	---	None	---	None
Rock outcrop----	D	Jan-Dec	>6.0	---	---	---	None	---	None
WrC:									
Wayah-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Burton----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
WrD:									
Wayah-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Burton----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
WrE:									
Wayah-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Burton----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
WsF:									
Wayah-----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
Burton----------	B	Jan-Dec	>6.0	---	---	---	None	---	None
WtB:									
Whiteside-------	B	Jan-May	2.0-3.0	Apparent	---	---	None	---	None
		Jun-Nov	2.0-3.5	Apparent	---	---	None	---	None
		Dec	2.0-3.0	Apparent	---	---	None	---	None

Table 21.—Classification of the Soils

(An asterisk in the first column indicates a taxadjunct to the series. See text for a description of those characteristics that are outside the range of the series)

Soil name	Family or higher taxonomic class
Ashe	Coarse-loamy, mixed, active, mesic Typic Dystrudepts
Biltmore	Mixed, mesic Typic Udipsamments
Braddock	Fine, mixed, semiactive, mesic Typic Hapludults
Brasstown	Fine-loamy, mixed, subactive, mesic Typic Hapludults
Buladean	Coarse-loamy, mixed, active, mesic Typic Dystrudepts
Burton	Fine-loamy, isotic, frigid Humic Dystrudepts
Calvin	Loamy-skeletal, mixed, active, mesic Typic Dystrudepts
Cataloochee	Fine-loamy, isotic, frigid Humic Dystrudepts
Cataska	Loamy-skeletal, mixed, semiactive, mesic, shallow Typic Dystrudepts
Cheoah	Fine-loamy, isotic, mesic Humic Dystrudepts
Chestnut	Coarse-loamy, mixed, active, mesic Typic Dystrudepts
Chestoa	Fine-loamy, siliceous, active, mesic Humic Dystrudepts
Chiltoskie	Fine-loamy, isotic, frigid Typic Dystrudepts
Cleveland	Loamy, mixed, active, mesic Lithic Dystrudepts
*Clifton	Fine, mixed, semiactive, mesic Typic Hapludults
Cowee	Fine-loamy, parasesquic, mesic Typic Hapludults
Dellwood	Sandy-skeletal, mixed, mesic Oxyaquic Dystrudepts
Dillard	Fine-loamy, mixed, semiactive, mesic Aquic Hapludults
*Ditney	Coarse-loamy, mixed, semiactive, mesic Typic Dystrudepts
Edneyville	Coarse-loamy, mixed, active, mesic Typic Dystrudepts
Ela	Coarse-loamy, mixed, superactive, acid, mesic Fluvaquentic Humaquepts
Evard	Fine-loamy, parasesquic, mesic Typic Hapludults
Fannin	Fine-loamy, paramicaceous, mesic Typic Hapludults
French	Fine-loamy over sandy or sandy-skeletal, mixed, active, mesic Fluvaquentic Dystrudepts
Guyot	Fine-loamy, isotic, frigid Humic Dystrudepts
Heintooga	Loamy-skeletal, isotic, frigid Humic Dystrudepts
Hemphill	Fine, mixed, active, mesic Umbric Endoaqualfs
Jeffrey	Fine-loamy, isotic, mesic Humic Dystrudepts
Junaluska	Fine-loamy, mixed, subactive, mesic Typic Hapludults
Keener	Fine-loamy, siliceous, semiactive, mesic Typic Hapludults
Mars Hill	Coarse-loamy, mixed, superactive, mesic Dystric Eutrudepts
Maymead	Coarse-loamy, mixed, semiactive, mesic Typic Dystrudepts
Northcove	Loamy-skeletal, mixed, semiactive, mesic Typic Dystrudepts
Oconaluftee	Fine-loamy, isotic, frigid Humic Dystrudepts
Oteen	Loamy, mixed, superactive, mesic, shallow Dystric Eutrudepts
Porters	Fine-loamy, isotic, mesic Typic Dystrudepts
Reddies	Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, mesic Oxyaquic Dystrudepts
Rosman	Coarse-loamy, mixed, superactive, mesic Fluventic Humic Dystrudepts
Soco	Coarse-loamy, mixed, active, mesic Typic Dystrudepts
Statler	Fine-loamy, mixed, active, mesic Humic Hapludults
Stecoah	Coarse-loamy, mixed, active, mesic Typic Dystrudepts
Sylco	Loamy-skeletal, mixed, active, mesic Typic Dystrudepts
Sylva	Coarse-loamy, mixed, semiactive, acid, mesic Humic Endoaquepts
Tate	Fine-loamy, mixed, semiactive, mesic Typic Hapludults
Toecane	Loamy-skeletal, mixed, active, mesic Humic Hapludults
Toxaway	Fine-loamy, mixed, superactive, nonacid, mesic Cumulic Humaquepts
Tusquitee	Fine-loamy, isotic, mesic Typic Dystrudepts
Udifluvents	Udifluvents
Udorthents	Udorthents
Unaka	Fine-loamy, isotic, mesic Typic Dystrudepts
Unicoi	Loamy-skeletal, mixed, semiactive, mesic Lithic Dystrudepts
Unison	Fine, mixed, semiactive, mesic Typic Hapludults
Walnut	Coarse-loamy, mixed, superactive, mesic Dystric Eutrudepts
Wayah	Fine-loamy, isotic, frigid Humic Dystrudepts
Whiteside	Fine-loamy, mixed, active, mesic Aquic Hapludults

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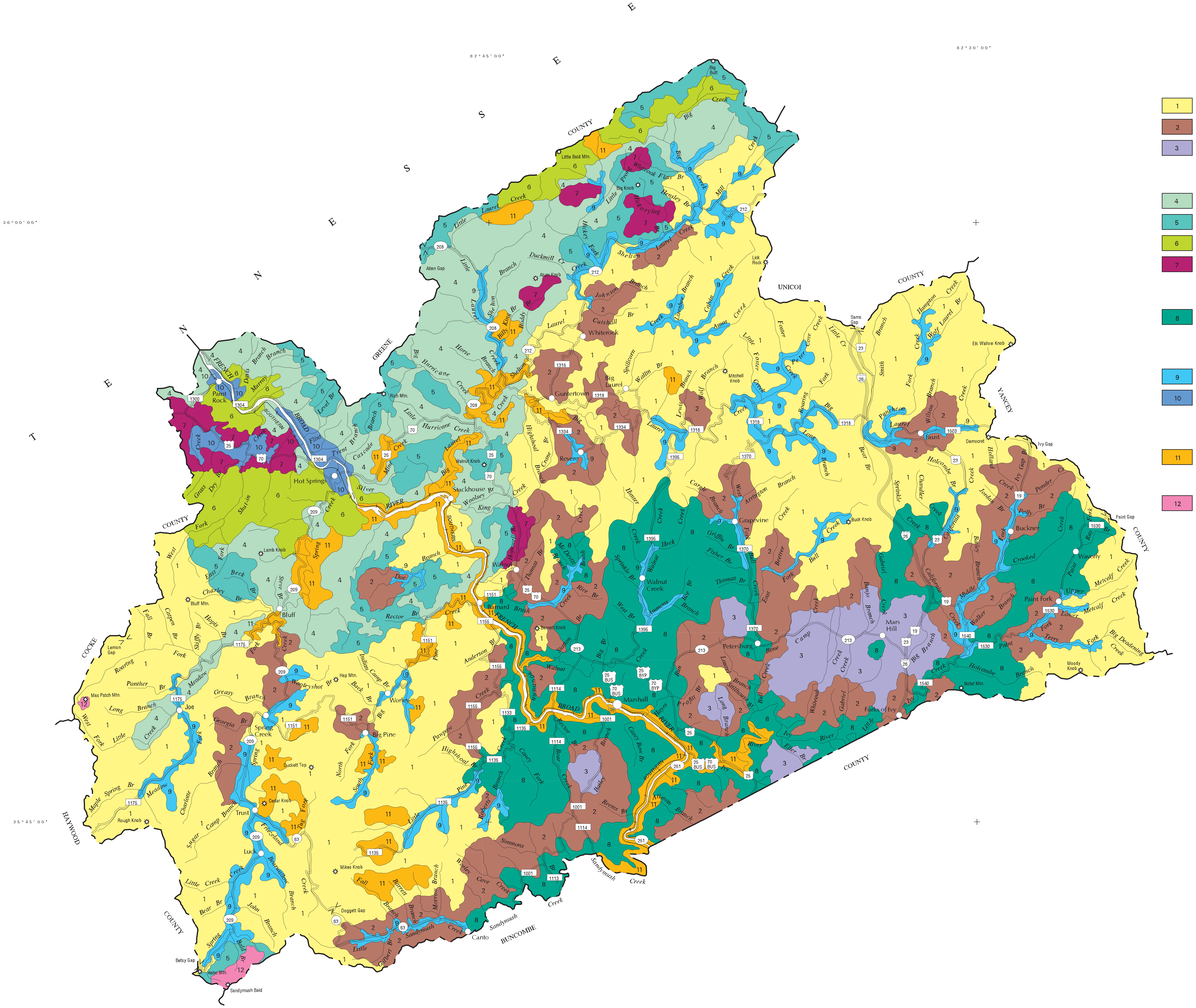


Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

LEGEND

FELSIC or MAFIC HIGH-GRADE METAMORPHIC GEOLOGY: Gently sloping to very steep, moderately deep to very deep, well drained soils with coarse loamy to clayey and loamy-skeletal subsoils; formed in residuum and colluvium weathered from felsic or mafic high-grade metamorphic and igneous rock; on intermountain hills, low and intermediate mountains, and in coves.

1	BULADEAN-PORTERS-TOECANE ASSOCIATION
2	EVARD-COWEE-TATE ASSOCIATION
3	CLIFTON-EVARD-TATE ASSOCIATION

LOW-GRADE METASEDIMENTARY GEOLOGY: Moderately steep to very steep, very shallow to very deep, excessively to well drained soils with coarse loamy, fine loamy, and loamy-skeletal subsoils; formed in residuum and colluvium weathered from low-grade metasedimentary rock; on low and intermediate mountains and in coves.

4	SYLCO-CATASKA-SOCO-NORTHCOVE ASSOCIATION
5	SOCO-STECOAH-NORTHCOVE ASSOCIATION
6	DITNEY-UNICOI-NORTHCOVE-ROCK OUTCROP ASSOCIATION
7	JUNALUSKA-BRASSTOWN-NORTHCOVE ASSOCIATION

MAFIC HIGH-GRADE METAMORPHIC GEOLOGY: Strongly sloping to very steep, shallow to very deep, somewhat excessively to well drained soils with coarse loamy subsoils; formed in residuum and colluvium weathered from mafic high-grade metamorphic and igneous rock; on low and intermediate mountains.

8	WALNUT-OTEEN-MARS HILL ASSOCIATION

COVES, FLOOD PLAINS, AND STREAM TERRACES: Nearly level to steep, very deep, well to somewhat poorly drained soils with loamy-skeletal to clayey subsoils; formed in colluvium and alluvium derived from felsic or mafic high-grade metamorphic, igneous, and low-grade metasedimentary rock; in coves, on fans, high stream terraces, and flood plains.

9	TOECANE-DELLWOOD-TATE-FRENCH ASSOCIATION
10	UNISON-BILTMORE-ROSMAN ASSOCIATION

RIVER GORGE and CLIFF FACES: Moderately steep to very steep, very shallow to moderately deep, somewhat excessively to excessively drained soils with loamy to loamy-skeletal subsoils; formed in residuum weathered from felsic or mafic high-grade metamorphic, igneous, and low-grade metasedimentary rock; in river gorges and cliff faces of low and intermediate mountains.

11	ROCK OUTCROP-OTEEN-CATASKA-CLEVELAND ASSOCIATION

HIGH MOUNTAINS: Strongly sloping to very steep, deep to very deep, well drained soils with coarse loamy subsoils; formed in residuum weathered from low-grade metasedimentary or igneous rock; on high mountains.

12	OCONALUFTEE-GUYOT-WAYAH ASSOCIATION

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
FOREST SERVICE
NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
NORTH CAROLINA AGRICULTURAL RESEARCH SERVICE
NORTH CAROLINA COOPERATIVE EXTENSION SERVICE
MADISON SOIL AND WATER CONSERVATION DISTRICT
MADISON COUNTY BOARD OF COMMISSIONERS

GENERAL SOIL MAP
MADISON COUNTY, NORTH CAROLINA

N

1 0 1 2 3
MILES

1 0 1 2 3 4 5 6
KILOMETERS

SCALE = 1:110000

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT
AND NATURAL RESOURCES

DIVISION OF LAND RESOURCES
GEOLOGICAL SURVEY SECTION

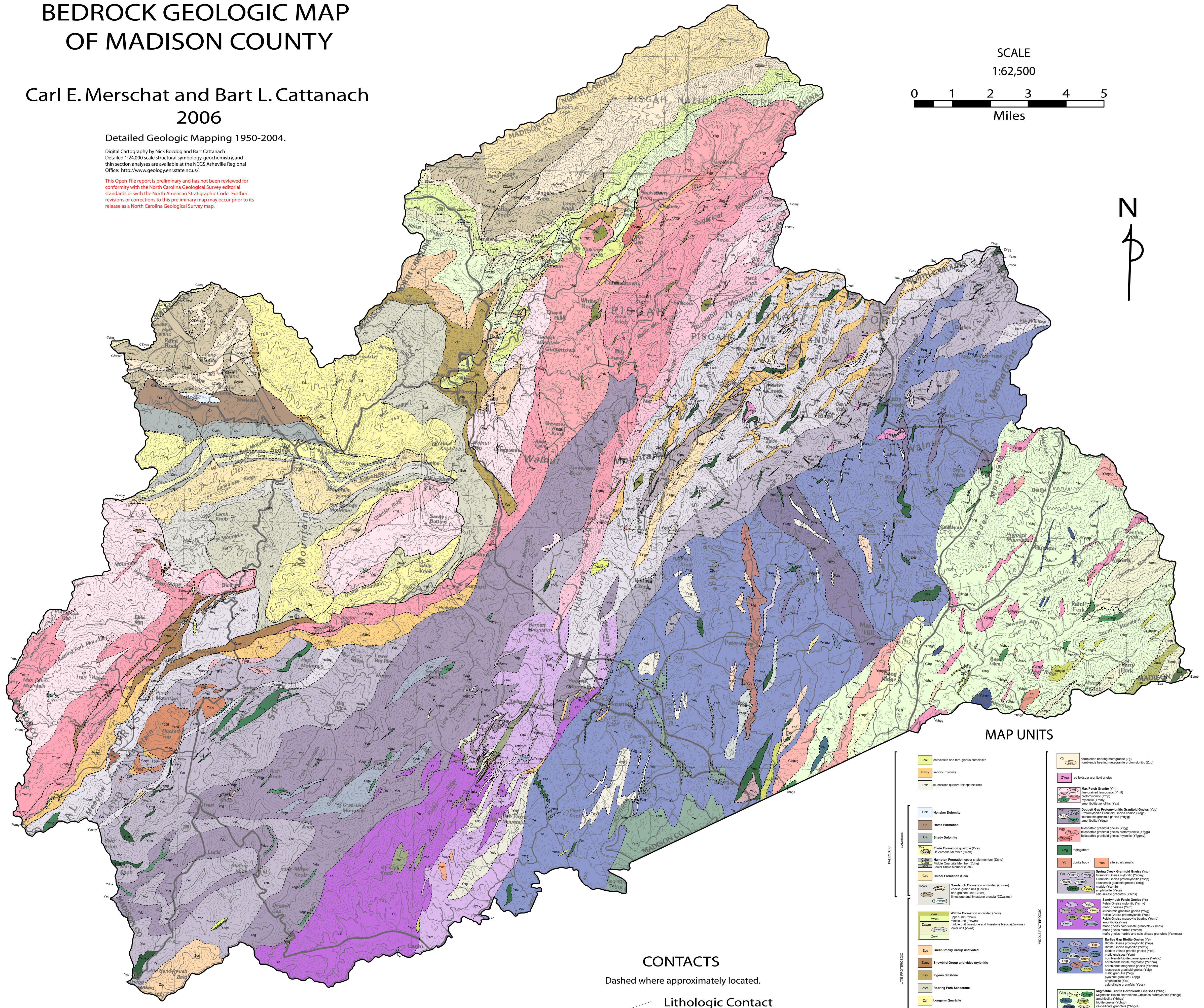
BEDROCK GEOLOGIC MAP OF MADISON COUNTY

Carl E. Merschat and Bart L. Cattanach
2006

Detailed Geologic Mapping 1950-2004.

Digital Cartography by Nick Bozdog and Bart Cattanach
Detailed 1:24,000 scale structural symbology, geochemistry, and thin section analyses are available at the NCGS Asheville Regional Office: http://www.geology.enr.state.nc.us/.

This Open-File report is preliminary and has not been reviewed for conformity with the North Carolina Geological Survey editorial standards or with the North American Stratigraphic Code. Further revisions or corrections to this preliminary map may occur prior to its release as a North Carolina Geological Survey map.



SCALE
1:62,500
0 1 2 3 4 5
Miles

N

CONTACTS

Dashed where approximately located.

Lithologic Contact

Fault Contact

MAP UNITS

PALEOZOIC

Pzc	cataclasite and ferruginous cataclasite
Pzmy	sericitic mylonite
Pzlq	leucocratic quartzo-feldspathic rock

CAMBRIAN

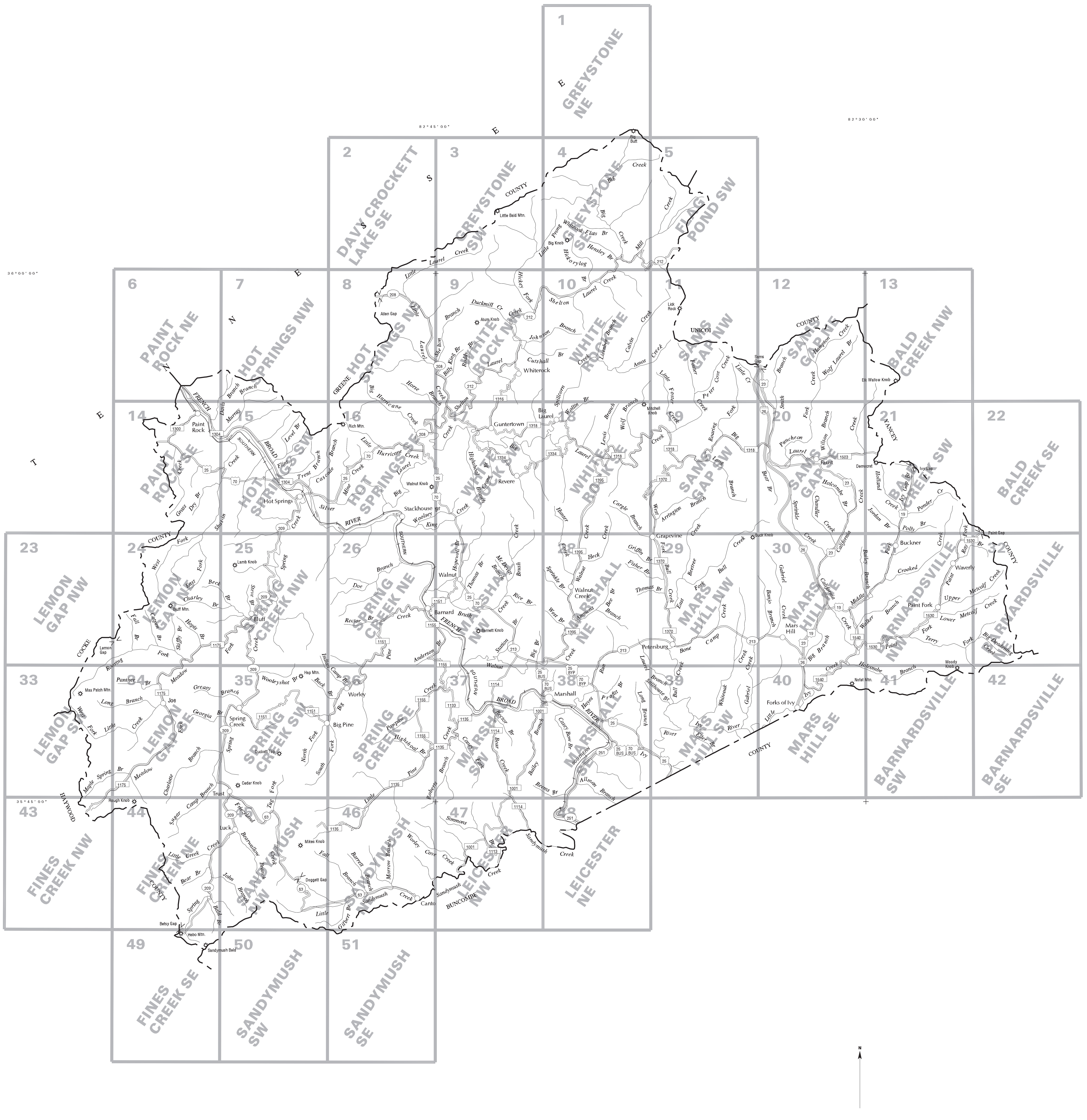
Ꞓhk	**Honaker Dolomite**
Ꞓr	**Rome Formation**
Ꞓs	**Shady Dolomite**
Ꞓce Ꞓceh	**Erwin Formation** quartzite (Ꞓce) Helenmode Member (Ꞓceh)
Ꞓchu Ꞓchq Ꞓchl	**Hampton Formation** upper shale member (Ꞓchu) Middle Quartzite Member (Ꞓchq) Lower Shale Member (Ꞓchl)
Ꞓcu	**Unicoi Formation** (Ꞓcu)
ꞒZwsu ꞒZwsc ꞒZwsf ꞒZwslms	**Sandsuck Formation** undivided (ꞒZwsu) coarse-graind unit (ꞒZwsc) fine-grained unit (ꞒZwsf) limestone and limestone breccia (ꞒZwslms)

LATE PROTEROZOIC

Zww Zwwu Zwwm Zwwlms Zwwl	**Wilhite Formation** undivided (Zww) upper unit (Zwwu) middle unit (Zwwm) middle unit limestone and limestone breccia(Zwwlms) lower unit (Zwwl)
Zgs	**Great Smoky Group undivided**
Zsmy	**Snowbird Group undivided mylonitic**
Zsp	**Pigeon Siltstone**
Zsrf	**Roaring Fork Sandstone**
Zsl	**Longarm Quartzite**
Zswbu Zswbp Zswbw	**Wading Branch Formation** undivided (Zswbu) phyllite member (Zswbp) feldspathic metagraywacke (Zswbw)
Zaa Zacs Zamb	**Ashe Metamorphic Suite** amphibolite (Zaa) calc-silicate (Zacs) muscovite biotite gneiss (Zamb)
Zbg	**Bakersville Metagabbro**

MIDDLE PROTEROZOIC

Zg Zgp	hornblende bearing metagranite (Zg) hornblende bearing metagranite protomylonitic (Zgp)
ZYgg	red feldspar granitoid gneiss
Ym Ymfl Ymp Ymmy Yax	**Max Patch Granite** (Ym) fine-grained leucocratic (Ymfl) protomylonitic (Ymp) mylonitic (Ymmy) amphibolite xenoliths (Yax)
Ydg Ydgc Ydglg Ydga	**Doggett Gap Protomylonitic Granitoid Gneiss** (Ydg) Protomylonitic Granitoid Gneiss coarse (Ydgc) leucocratic granitoid gneiss (Ydglg) amphibolite (Ydga)
Yfgg Yfggp Yfggmy	feldspathic granitoid gneiss (Yfgg) feldspathic granitoid gneiss protomylonitic (Yfggp) feldspathic granitoid gneiss mylonitic (Yfggmy)
Ymg	metagabbro
Yd	dunite body
Yua	altered ultramafic
Ysc Yscmy Yscp Ysclg Yscmb Ysca Ysccs	**Spring Creek Granitoid Gneiss** (Ysc) Granitoid Gneiss mylonitic (Yscmy) Granitoid Gneiss protomylonitic (Yscp) leucocratic granitoid gneiss (Ysclg) marble (Yscmb) amphibolite (Ysca) calc-silicate granofels (Ysccs)
Ys Ysm Yslg Ysmy Ysp Ysmu Ysa Ysmcs Ysmm Ysmmcs	**Sandymush Felsic Gneiss** (Ys) Felsic Gneiss mylonitic (Ysmy) mafic gneisses (Ysm) leucocratic granitoid gneiss (Yslg) Felsic Gneiss protomylonitic (Ysp) Felsic Gneiss muscovite bearing (Ysmu) amphibolite (Ysa) mafic gneiss calc-silicate granofels (Ysmcs) mafic gneiss marble (Ysmm) mafic gneiss marble and calc-silicate granofels (Ysmmcs)
Ye Yep Yee Yem Yemy Yehbg Yehbm Yehma Yelg Yeg Yepg Yea Yecs	**Earlies Gap Biotite Gneiss** (Ye) Biotite Gneiss protomylonitic (Yep) Biotite Gneiss mylonitic (Yemy) epidote veined granitic gneiss (Yee) mafic gneisses (Yem) hornblende biotite garnet gneiss (Yehbg) hornblende biotite migmatite (Yehbm) hornblende magnetite gneiss (Yehma) leucocratic granitoid gneiss (Yelg) mafic granulite (Yeg) pyoxene granulite (Yepg) amphibolite (Yea) calc-silicate granofels (Yecs)
Ybhg Ybhgp Ybhga Ybhgb Ybhgcs Ybhgm Ybhge	**Migmatitic Biotite Hornblende Gneisses** (Ybhg) Migmatitic Biotite Hornblende Gneisses protmylonitic (Ybhgp) amphibolite (Ybhga) biotite gneiss (Ybhgb) calc-silicate granofels (Ybhgcs) magnetite biotite granitic gneiss (Ybhgm) epidote veined granitic gneiss (Ybhge)
Ygbg	granoblastic biotite granitic gneiss
Ygf	aluminous granofels
Yggg	garnet-rich granulite gneiss
Ygqm	quartz monzodioritic granulite gneiss
Ygt	tonalitic granulite
Ybhgpg	pyroxene granulite
Ybhgg	mafic granulite



INDEX TO MAP SHEETS
MADISON COUNTY, NORTH CAROLINA

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MILES

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KILOMETERS

SCALE = 1:110000

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE AND FOREST SERVICE

MADISON COUNTY, NORTH CAROLINA

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
NORTH CAROLINA AGRICULTURAL RESEARCH SERVICE
NORTH CAROLINA COOPERATIVE EXTENSION SERVICE
MADISON SOIL AND WATER CONSERVATION DISTRICT
MADISON COUNTY BOARD OF COMMISSIONERS

SOIL LEGEND

Map unit symbols and names are listed in alphabetical order. Map symbols consist of letters or a combination of letters and numbers. The first letter is capitalized and is the first letter of the series name (or the name of the higher classification or miscellaneous area). The second letter is lowercase. The third letter is capitalized and indicates the class of slope. The number 2 at the end of a map unit symbol indicates a moderately eroded phase.

SYMBOL	NAME
AcD	Ashe-Cleveland-Rock outcrop complex, 15 to 30 percent slopes, very stony
ArE	Ashe-Cleveland-Rock outcrop complex, 30 to 50 percent slopes, very bouldery
ArF	Ashe-Cleveland-Rock outcrop complex, 50 to 95 percent slopes, very bouldery
BaA	Biltmore loamy sand, 0 to 3 percent slopes, occasionally flooded
BkB2	Braddock clay loam, 2 to 8 percent slopes, moderately eroded
BkC2	Braddock clay loam, 8 to 15 percent slopes, moderately eroded
BkD2	Braddock clay loam, 15 to 30 percent slopes, moderately eroded
BnD	Buladean-Chestnut complex, 15 to 30 percent slopes, stony
BnE	Buladean-Chestnut complex, 30 to 50 percent slopes, stony
BnF	Buladean-Chestnut complex, 50 to 95 percent slopes, stony
CaD	Calvin channery silt loam, 15 to 30 percent slopes
CaE	Calvin channery silt loam, 30 to 50 percent slopes
CaF	Calvin channery silt loam, 50 to 95 percent slopes
CfF	Cataska-Sylco-Rock outcrop complex, 50 to 95 percent slopes, very stony
ChD	Cheoah-Jeffrey complex, 15 to 30 percent slopes, stony
ChE	Cheoah-Jeffrey complex, 30 to 50 percent slopes, stony
ChF	Cheoah-Jeffrey complex, 50 to 95 percent slopes, stony
CsD	Chestoa sandy loam, 15 to 30 percent slopes
CsE	Chestoa sandy loam, 30 to 50 percent slopes
CsF	Chestoa sandy loam, 50 to 95 percent slopes
CtB2	Clifton clay loam, 2 to 8 percent slopes, moderately eroded
CtC2	Clifton clay loam, 8 to 15 percent slopes, moderately eroded
CtD2	Clifton clay loam, 15 to 30 percent slopes, moderately eroded
CtE2	Clifton clay loam, 30 to 50 percent slopes, moderately eroded
CxC	Clifton-Urban land complex, 2 to 15 percent slopes
DeA	Dellwood-Reddies complex, 0 to 3 percent slopes, occasionally flooded
DrB	Dillard loam, 1 to 5 percent slopes, rarely flooded
DtD	Ditney-Unicoi complex, 15 to 30 percent slopes, very stony
DuE	Ditney-Unicoi complex, 30 to 50 percent slopes, very rocky
DuF	Ditney-Unicoi complex, 50 to 95 percent slopes, very rocky
EdD	Edneyville-Chestnut complex, 15 to 30 percent slopes, stony
EdE	Edneyville-Chestnut complex, 30 to 50 percent slopes, stony
EdF	Edneyville-Chestnut complex, 50 to 95 perccent slopes, stony
EfA	Ela loam, 0 to 2 percent slopes, frequently flooded
EvD2	Evard-Cowee complex, 15 to 30 percent slopes, moderately eroded
EvE2	Evard-Cowee complex, 30 to 50 percent slopes, moderately eroded
EvF2	Evard-Cowee complex, 50 to 95 percent slopes, moderately eroded
EwD	Evard-Cowee complex, 15 to 30 percent slopes, stony
EwE	Evard-Cowee complex, 30 to 50 percent slopes, stony
EwF	Evard-Cowee complex, 50 to 95 percent slopes, stony
FnD2	Fannin sandy clay loam, 15 to 30 percent slopes, moderately eroded
FrA	French loam, 0 to 3 percent slopes, occasionally flooded
HcE	Heintooga-Chiltoskie complex, 30 to 50 percent slopes, very stony
HpA	Hemphill clay loam, 0 to 3 percent slopes, rarely flooded
JbD	Junaluska-Brasstown complex, 15 to 30 percent slopes
JbE	Junaluska-Brasstown complex, 30 to 50 percent slopes
JbF	Junaluska-Brasstown complex, 50 to 95 percent slopes
KnC	Keener loam, 8 to 15 percent slopes, stony
MwC	Mars Hill-Walnut complex, 8 to 15 percent slopes, stony
MwD	Mars Hill-Walnut complex, 15 to 30 percent slopes, stony
MwE	Mars Hill-Walnut complex, 30 to 50 percent slopes, stony
MwF	Mars Hill-Walnut complex, 50 to 95 percent slopes, stony
MyB	Maymead-Northcove complex, 2 to 8 percent slopes, stony
NhC	Northcove-Maymead complex, 8 to 15 percent slopes, stony
NtD	Northcove-Maymead complex, 15 to 30 percent slopes, very stony
NtE	Northcove-Maymead complex, 30 to 50 percent slopes, very stony
OwC	Oconaluftee-Guyot-Cataloochee complex, windswept, 8 to 15 percent slopes, bouldery
OwD	Oconaluftee-Guyot-Cataloochee complex, windswept, 15 to 30 percent slopes, bouldery
OwE	Oconaluftee-Guyot-Cataloochee complex, windswept, 30 to 50 percent slopes, bouldery
OwF	Oconaluftee-Guyot-Cataloochee complex, windswept, 50 to 95 percent slopes, bouldery
PwC	Porters-Unaka complex, 8 to 15 percent slopes, stony
PwD	Porters-Unaka complex, 15 to 30 percent slopes, stony
PwE	Porters-Unaka complex, 30 to 50 percent slopes, stony
PxF	Porters-Unaka complex, 50 to 95 percent slopes, rocky
RbA	Reddies sandy loam, 0 to 3 percent slopes, occasionally flooded
RcF	Rock outcrop-Cataska complex, 30 to 95 percent slopes, very stony
RhD	Rock outcrop-Chestoa complex, 8 to 30 percent slopes, very bouldery
RhF	Rock outcrop-Chestoa complex, 30 to 95 percent slopes, very bouldery
RkF	Rock outcrop-Cleveland complex, 30 to 95 percent slopes, very bouldery
RoF	Rock outcrop-Oteen complex, 30 to 95 percent slopes, very bouldery
RpF	Rock outcrop-Unicoi complex, 30 to 95 percent slopes, very bouldery
RsA	Rosman fine sandy loam, 0 to 3 percent slopes, occasionally flooded
SoD	Soco-Stecoah complex, 15 to 30 percent slopes, stony
SoE	Soco-Stecoah complex, 30 to 50 percent slopes, stony
SoF	Soco-Stecoah complex, 50 to 95 percent slopes, stony
StB	Statler loam, 1 to 5 percent slopes, rarely flooded
SwD	Sylco-Cataska-Complex, 15 to 30 percent slopes, very rocky
SwE	Sylco-Cataska complex, 30 to 50 percent slopes, very rocky
SyD	Sylco-Soco complex, 15 to 30 percent slopes, stony
SyE	Sylco-Soco complex, 30 to 50 percent slopes, stony
SzF	Sylco-Soco complex, 50 to 95 percent slopes, very stony
TaB	Tate loam, 2 to 8 percent slopes
TaC	Tate loam, 8 to 15 percent slopes
TaD	Tate loam, 15 to 30 percent slopes
TkC	Tate loam, 8 to 15 percent slopes, very stony
TkD	Tate loam, 15 to 30 percent slopes, very stony
TmC	Tate-Urban land complex, 2 to 15 percent slopes
ToD	Toecane very cobbly loam, 15 to 30 percent slopes, extremely bouldery
ToE	Toecane very cobbly loam, 30 to 50 percent slopes, extremely bouldery
TrC	Toecane-Tusquitee complex, 8 to 15 percent slopes, bouldery
TsD	Toecane-Tusquitee complex, 15 to 30 percent slopes, very bouldery
TsE	Toecane-Tusquitee complex, 30 to 50 percent slopes, very bouldery
TuD	Tusquitee-Toecane complex, 15 to 30 percent slopes, stony
TwB	Tusquitee-Whiteside complex, 2 to 8 percent slopes
TwC	Tusquitee-Whiteside complex, 8 to 15 percent slopes
UcB	Udifluvents, sandy, 0 to 5 percent slopes, frequently flooded
Ud	Udorthents, loamy
UfB	Udorthents-Urban land complex, 0 to 5 percent slopes, occasionally flooded
UhE	Udorthents-Urban land complex, 2 to 50 percent slopes
UkE	Unaka-Rock outcrop complex, 30 to 50 percent slopes, very bouldery
UkF	Unaka-Rock outcrop complex, 50 to 95 percent slopes, very bouldery
UrD	Unicoi-Rock outcrop complex, 8 to 30 percent slopes, very bouldery
UsB	Unison loam, 2 to 8 percent slopes
UsC	Unison loam, 8 to 15 percent slopes
UsD	Unison loam, 15 to 30 percent slopes
W	Water
WaC2	Walnut-Oteen-Mars Hill complex, 8 to 15 percent slopes, moderately eroded
WaD2	Walnut-Oteen-Mars Hill complex, 15 to 30 percent slopes, moderately eroded
WaE2	Walnut-Oteen-Mars Hill complex, 30 to 50 percent slopes, moderately eroded
WoF	Walnut-Oteen-Rock outcrop complex, 50 to 95 percent slopes
WrC	Wayah-Burton complex, windswept, 8 to 15 percent slopes, bouldery
WrD	Wayah-Burton complex, windswept, 15 to 30 percent slopes, bouldery
WrE	Wayah-Burton complex, windswept, 30 to 50 percent slopes, bouldery
WsF	Wayah-Burton complex, windswept, 50 to 95 percent slopes, very rocky
WtB	Whiteside loam, 2 to 8 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

SOIL SURVEY FEATURES

SOIL DELINEATIONS AND SYMBOLS	AaA ∼ BoB

LANDFORM FEATURES

Mine or quarry	⚒
Rock outcrop	∨
Severely eroded spot	≑
Short steep slope	....
Wet spot	Ψ

CULTURAL FEATURES

BOUNDARIES

National, state, or province	– – ———
County or parish	——— –
Field sheet matchline & neatline	———

TRANSPORTATION

Divided road	═══
Other road	———

ROAD EMBLEMS

Interstate	173
Federal	287
State	52
County	1283

LOCATED OBJECTS

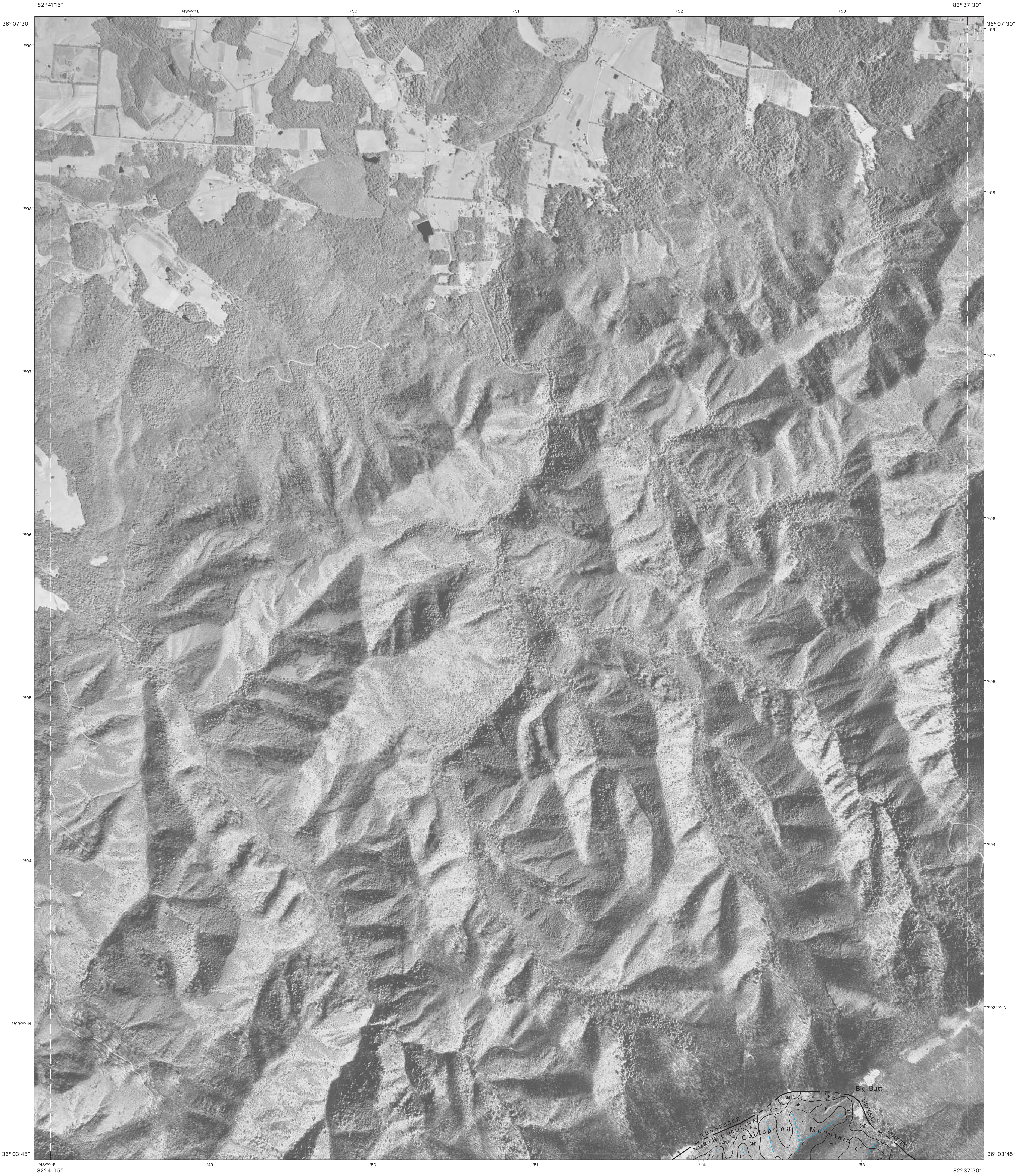
Cemetery	†
Church	⛪
School	▪
Soil sample site	Ⓢ

HYDROGRAPHIC FEATURES

Unclassified stream	∼

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MADISON COUNTY, NORTH CAROLINA
GREYSTONE NE QUADRANGLE
SHEET NUMBER 1 OF 51



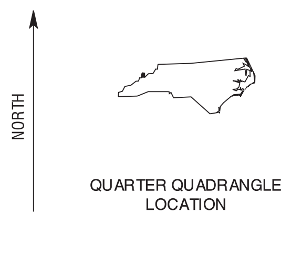
Joins sheet 3, Greystone SW

Joins sheet 4, Greystone SE

Joins sheet 5, Flag Pond SW

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1998-1999 aerial photography. Hydrography and cultural features were acquired from NRCS and edited to conform with the features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



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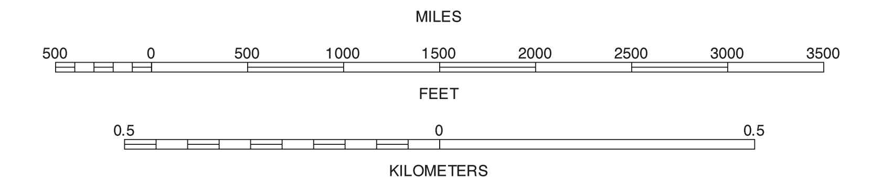

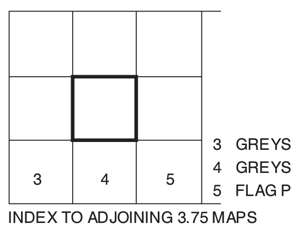

3 GREYSTONE SW
4 GREYSTONE SE
5 FLAG POND SW

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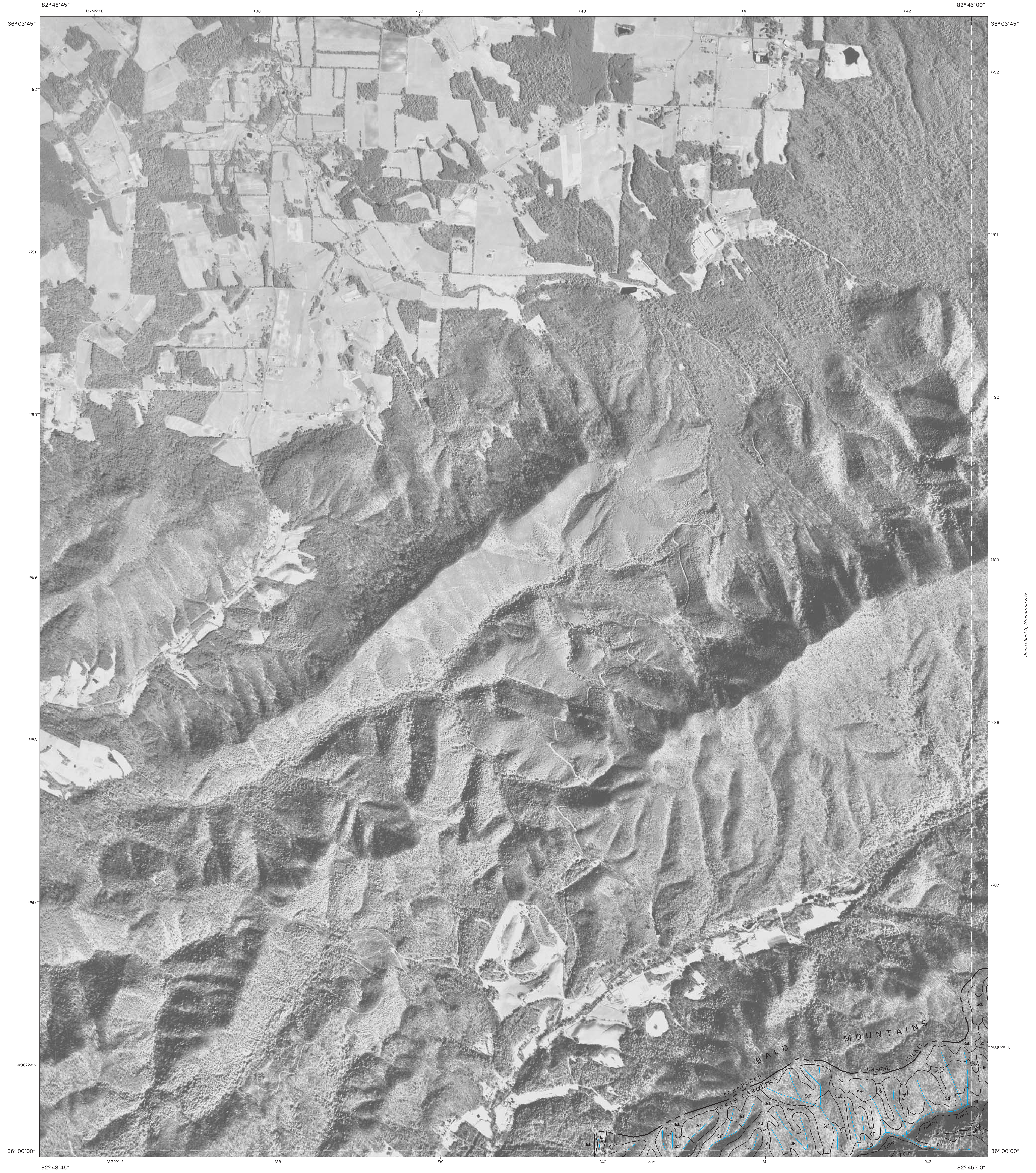
GREYSTONE NE, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 1 OF 51

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MADISON COUNTY, NORTH CAROLINA
DAVY CROCKETT LAKE SE QUADRANGLE
SHEET NUMBER 2 OF 51



Joins sheet 8, Hot Springs NE

Joins sheet 7, Hot Springs NW

Joins sheet 9, White Rock NW

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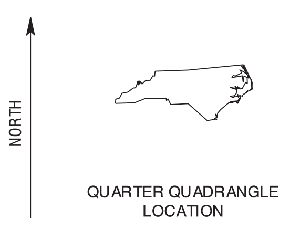
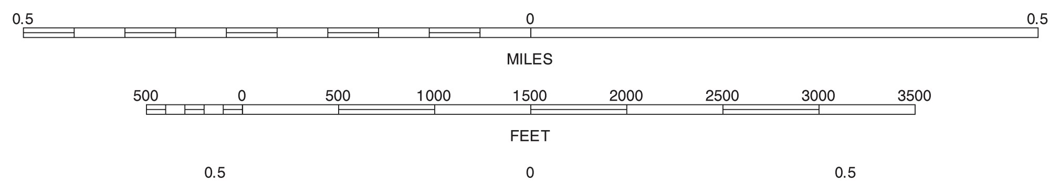
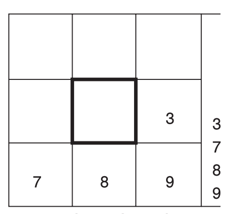


QUARTER QUADRANGLE
LOCATION

SCALE 1:12000





3 GREYSTONE SW
7 HOT SPRINGS NW
8 HOT SPRINGS NE
9 WHITE ROCK NW

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DAVY CROCKETT LAKE SE, NORTH CAROLINA

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UNITED STATES
DEPARTMENT OF AGRICULTURE
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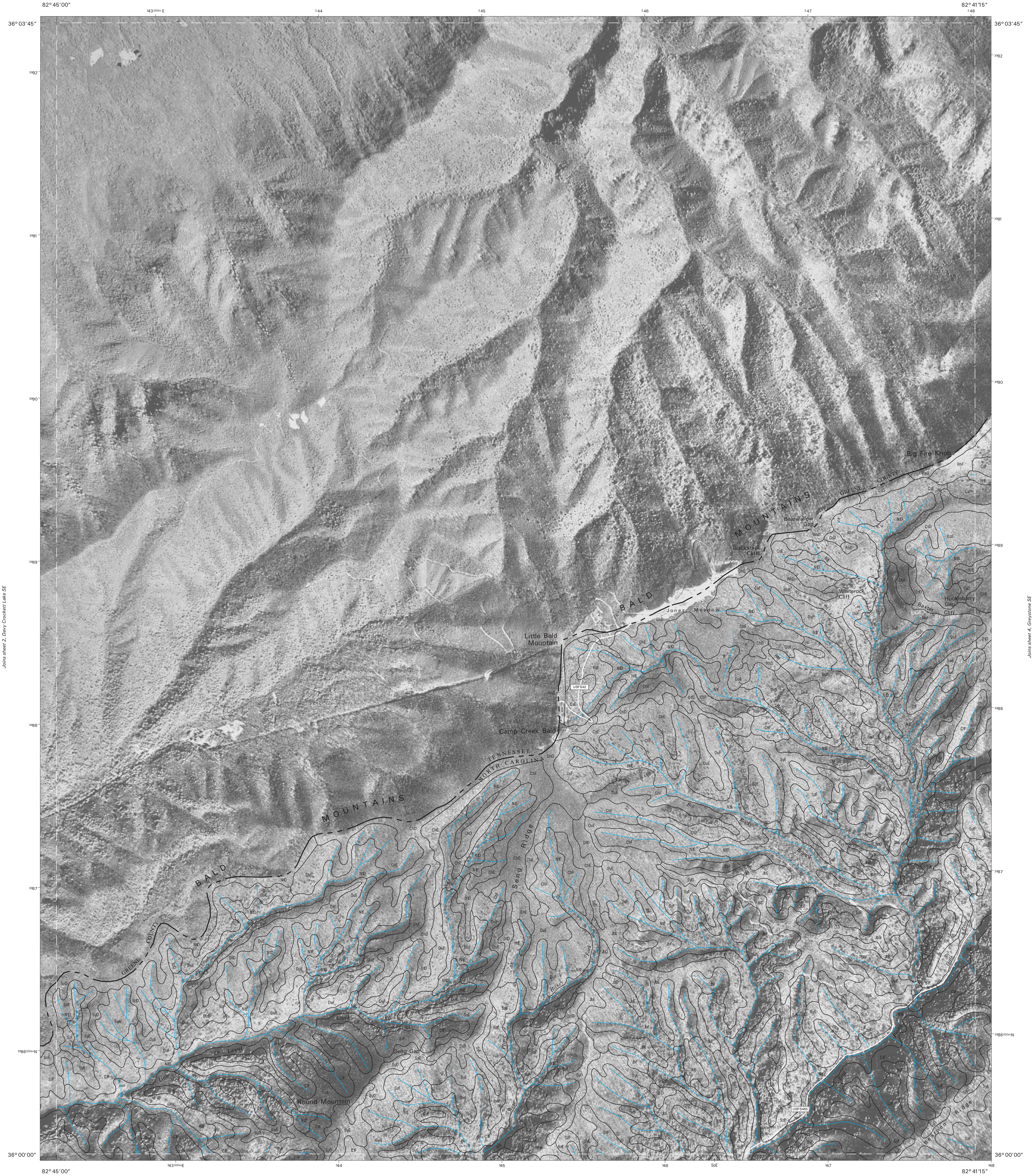
MADISON COUNTY, NORTH CAROLINA
GREYSTONE SW QUADRANGLE
SHEET NUMBER 3 OF 51

Joins sheet 1, Greystone NE

Joins sheet 2, Davy Crockett Lake SE

Joins sheet 4, Greystone SE



Joins sheet 8, Hot Springs NE

Joins sheet 9, White Rock NW

Joins sheet 10, White Rock NE

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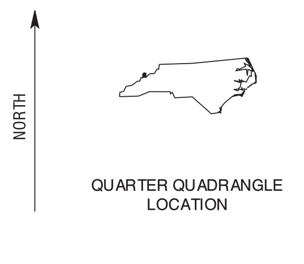

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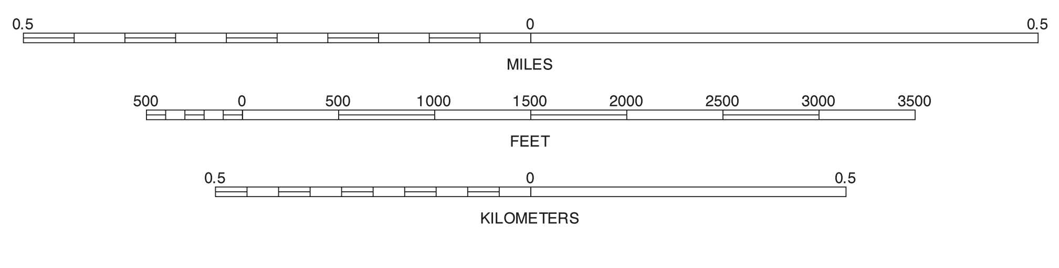

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2 DAVY CROCKETT LAKE SE
4 GREYSTONE SE
8 HOT SPRINGS NE
9 WHITE ROCK NW
10 WHITE ROCK NE

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UNITED STATES
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NATURAL RESOURCES CONSERVATION SERVICE

MADISON COUNTY, NORTH CAROLINA
GREYSTONE SE QUADRANGLE
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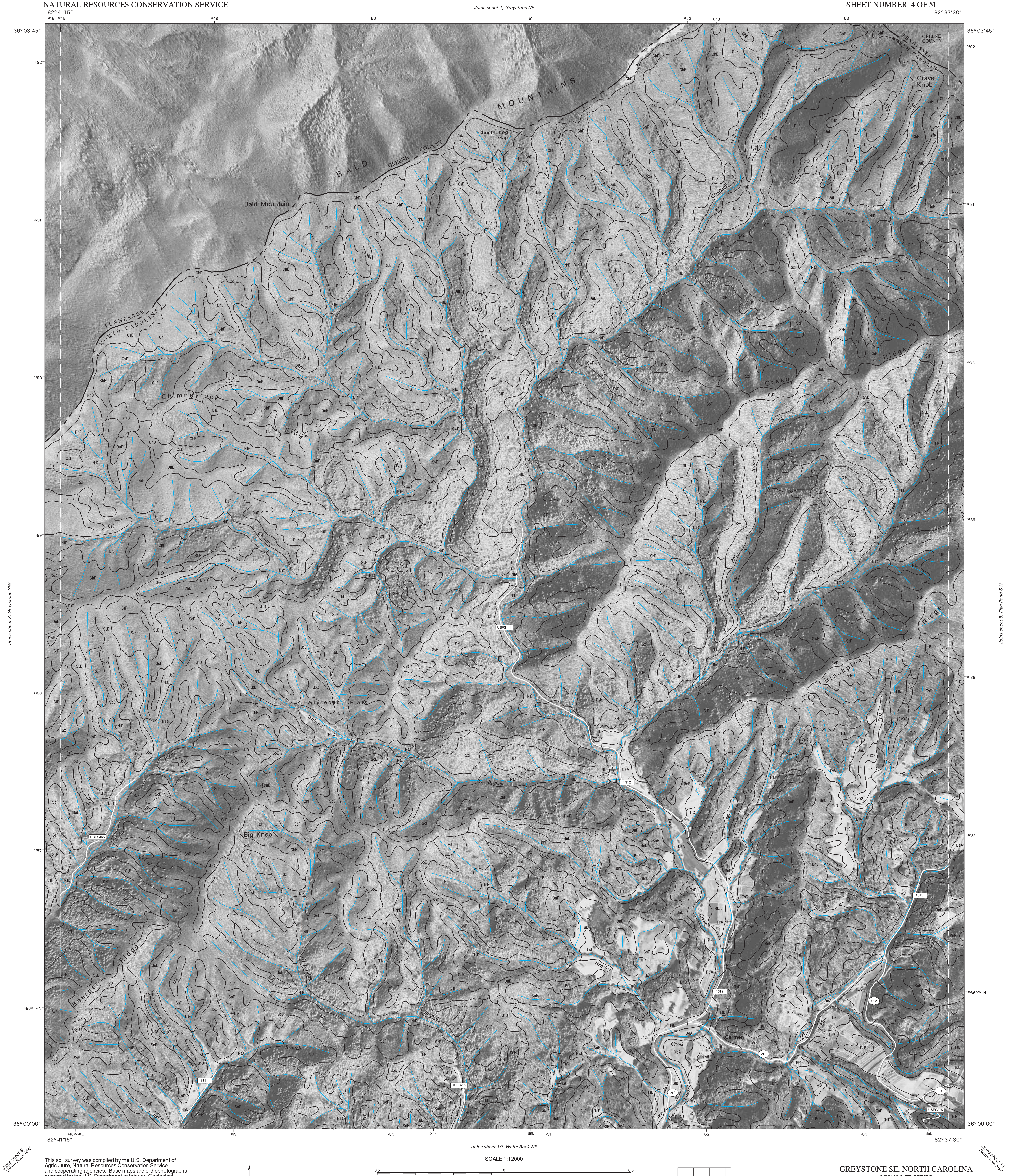

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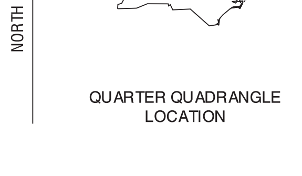
1000-meter ticks: Universal Transverse Mercator, zone 17.
Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE
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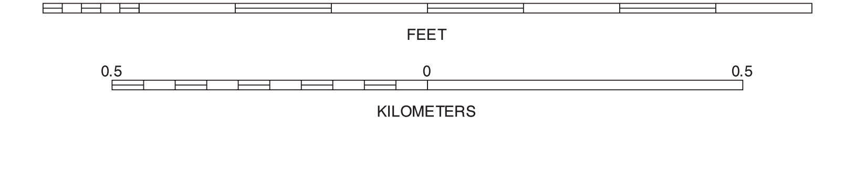

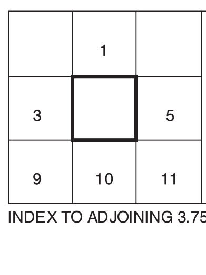

1 GREYSTONE NE
3 GREYSTONE SW
5 FLAG POND SW
9 WHITE ROCK NW
10 WHITE ROCK NE
11 SAMS GAP NW

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UNITED STATES
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NATURAL RESOURCES CONSERVATION SERVICE

MADISON COUNTY, NORTH CAROLINA
FLAG POND SW QUADRANGLE
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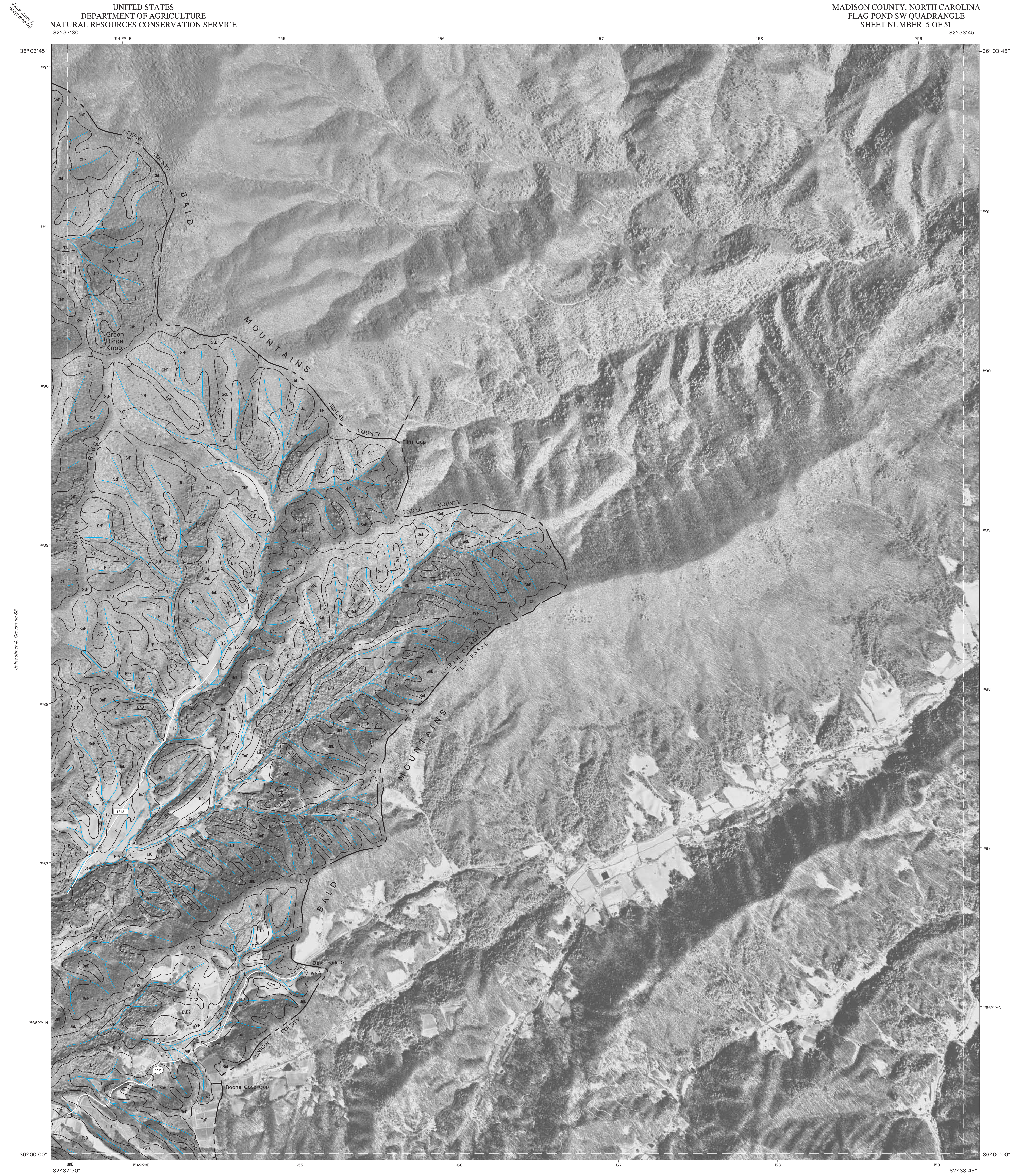

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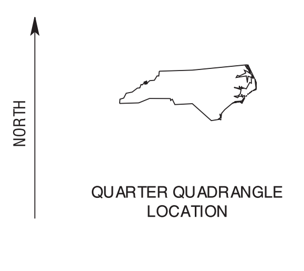
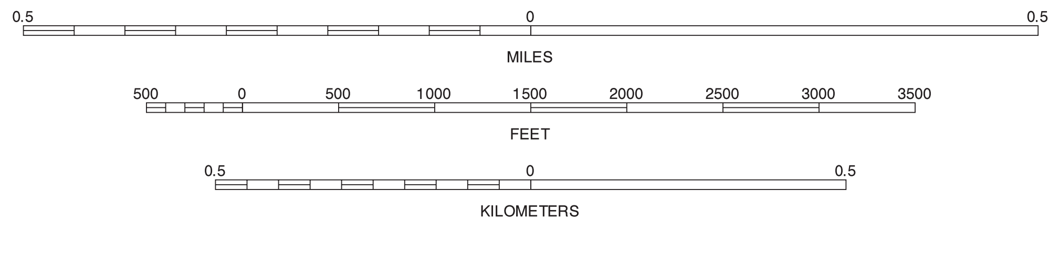


QUARTER QUADRANGLE
LOCATION

SCALE 1:12000



1			1 GREYSTONE NE
4	■		4 GREYSTONE SE
10	11	12	10 WHITE ROCK NE 11 SAMS GAP NW 12 SAMS GAP NE

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UNITED STATES
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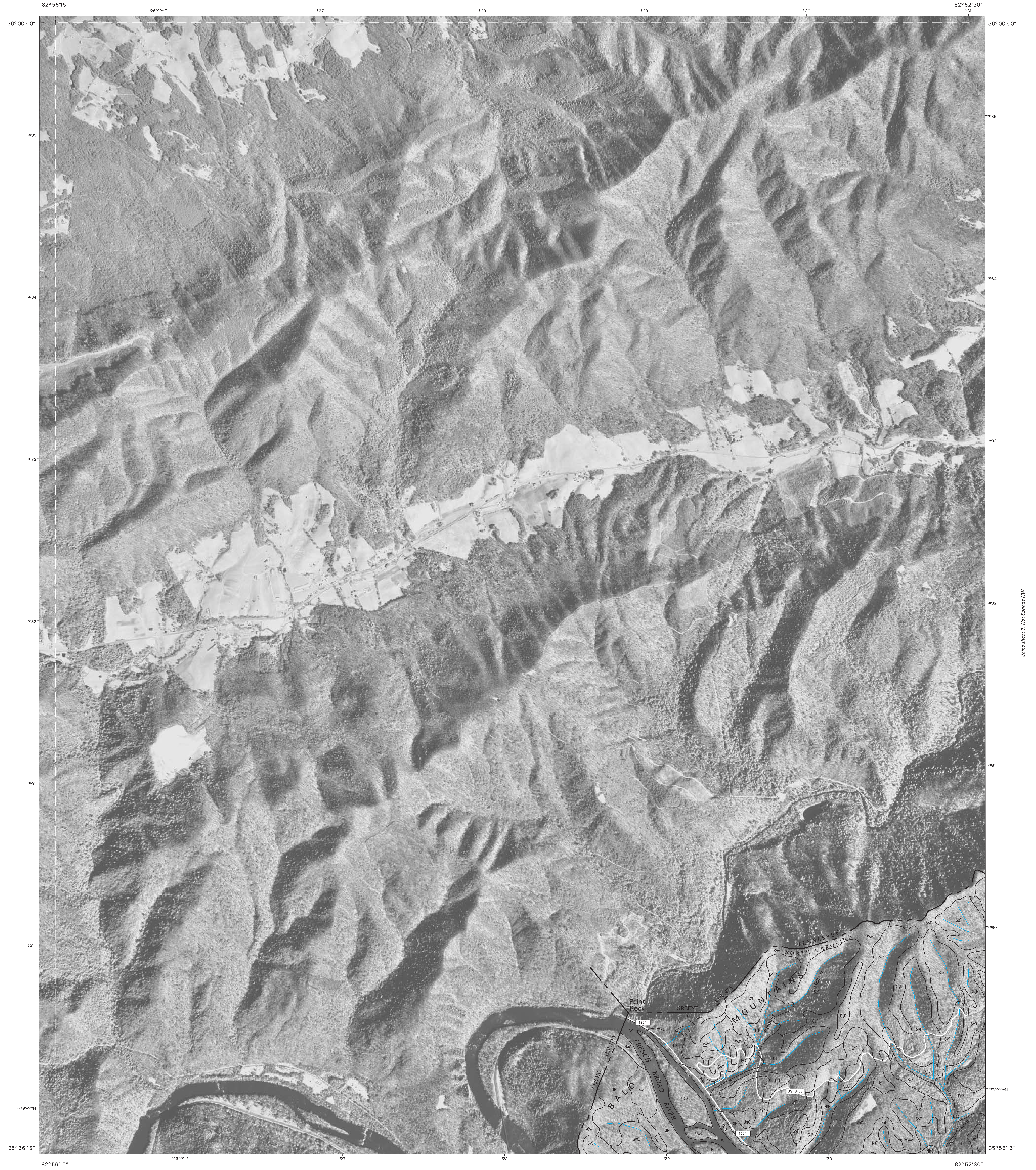
NATURAL RESOURCES CONSERVATION SERVICE

MADISON COUNTY, NORTH CAROLINA
PAINT ROCK NE QUADRANGLE
SHEET NUMBER 6 OF 51



Joins sheet 7, Hot Springs NW

Joins sheet 14, Paint Rock SE

Joins sheet 15, Hot Springs SW

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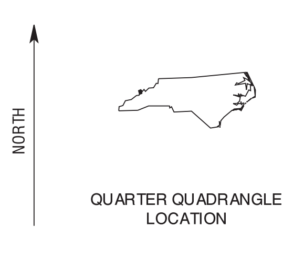

QUARTER QUADRANGLE LOCATION

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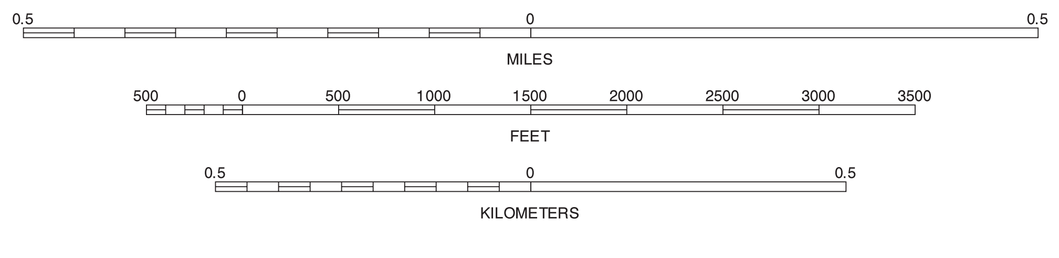

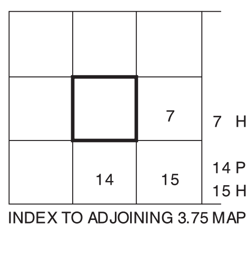

7 HOT SPRINGS NW
14 PAINT ROCK SE
15 HOT SPRINGS SW

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PAINT ROCK NE, NORTH CAROLINA

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Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
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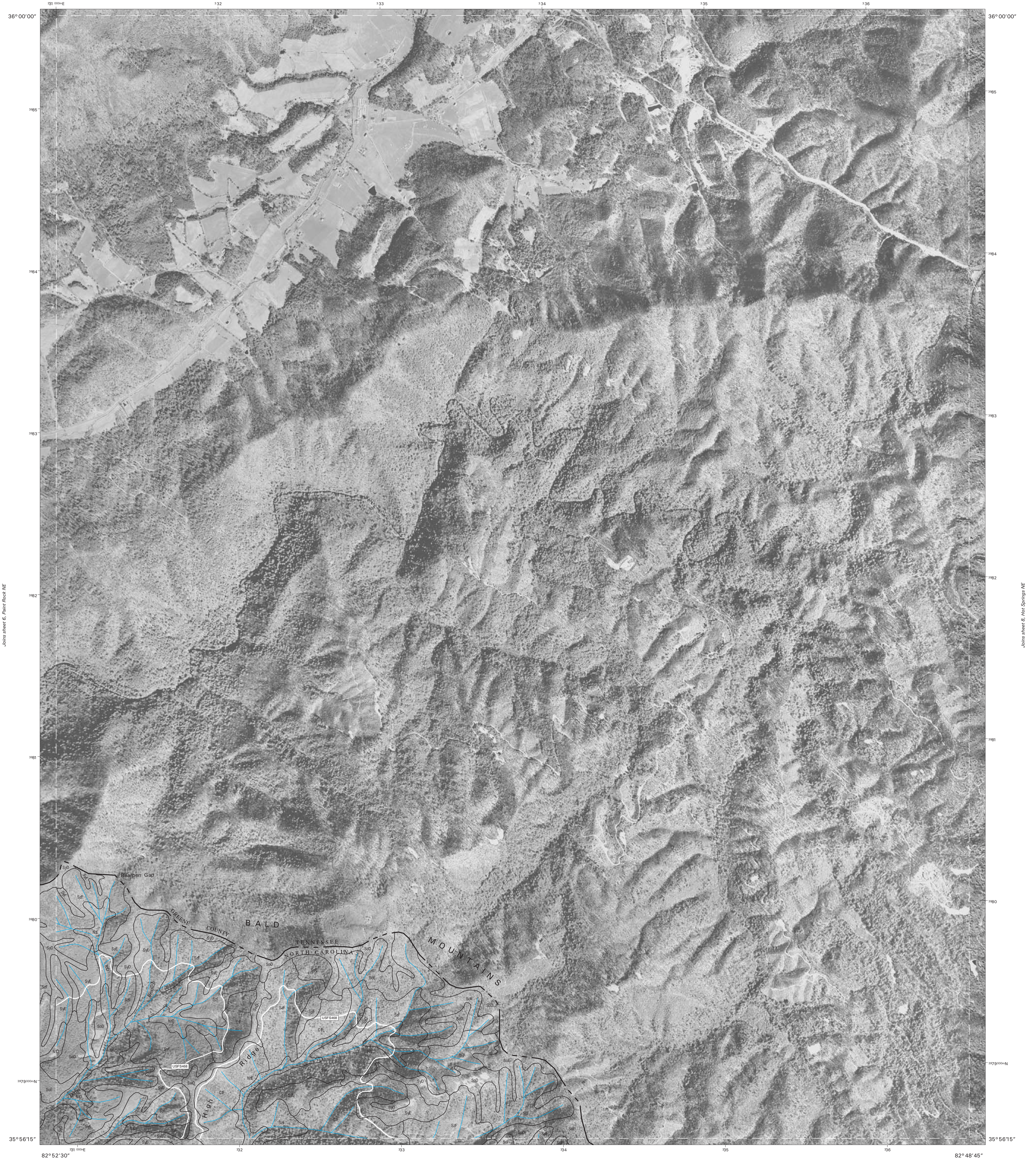
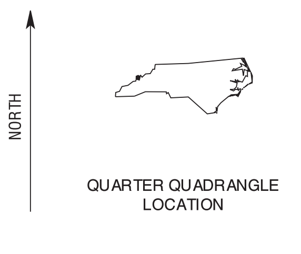
NATURAL RESOURCES CONSERVATION SERVICE

MADISON COUNTY, NORTH CAROLINA
HOT SPRINGS NW QUADRANGLE
SHEET NUMBER 7 OF 51



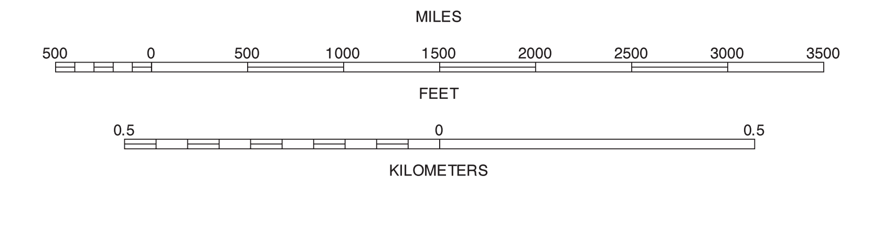
This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1998-1999 aerial photography. Hydrography and cultural features were acquired from NRCS and edited to conform with the features represented on the publication orthophotography and to enhance the clarity of the soils information.

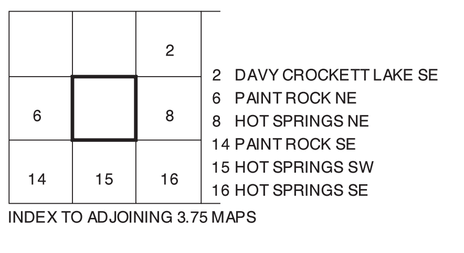
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE
LOCATION

SCALE 1:12000





2 DAVY CROCKETT LAKE SE
6 PAINT ROCK NE
8 HOT SPRINGS NE
14 PAINT ROCK SE
15 HOT SPRINGS SW
16 HOT SPRINGS SE

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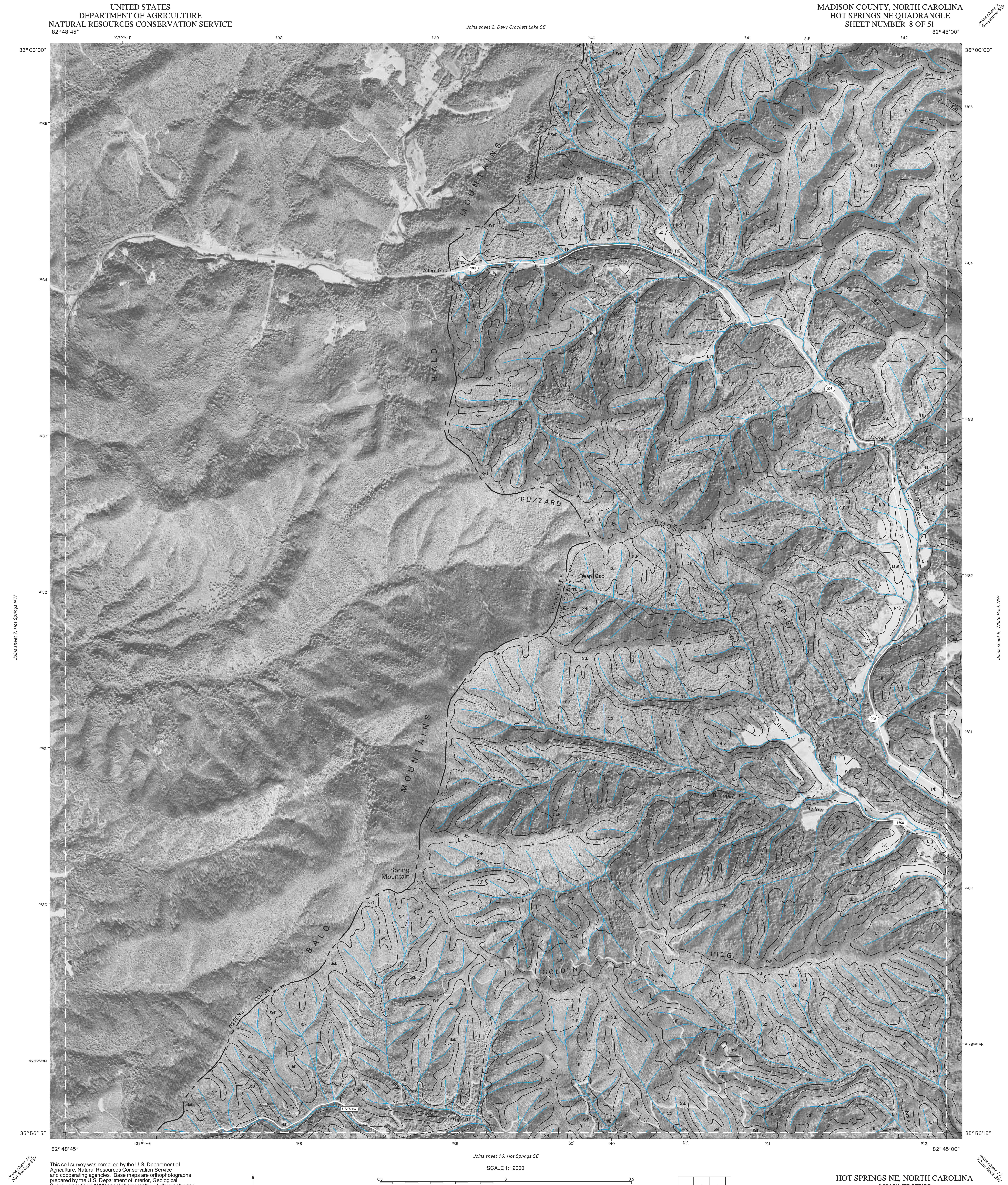
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MADISON COUNTY, NORTH CAROLINA
HOT SPRINGS NE QUADRANGLE
SHEET NUMBER 8 OF 51



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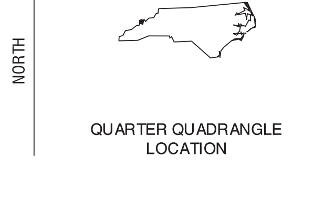
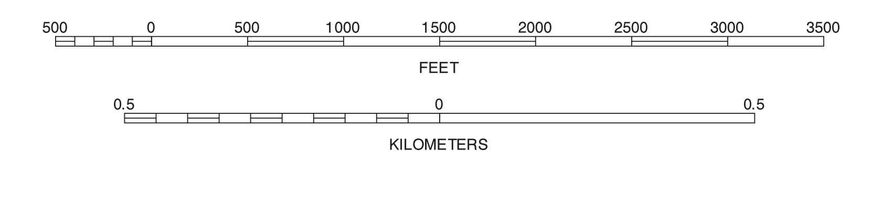
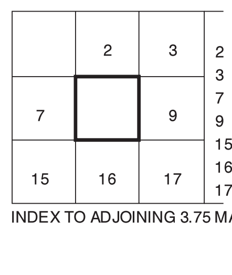


QUARTER QUADRANGLE LOCATION

SCALE 1:12000





2 DAVY CROCKETT LAKE SE
3 GREYSTONE SW
7 HOT SPRINGS NW
9 WHITE ROCK NW
15 HOT SPRINGS SW
16 HOT SPRINGS SE
17 WHITE ROCK SW

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DEPARTMENT OF AGRICULTURE
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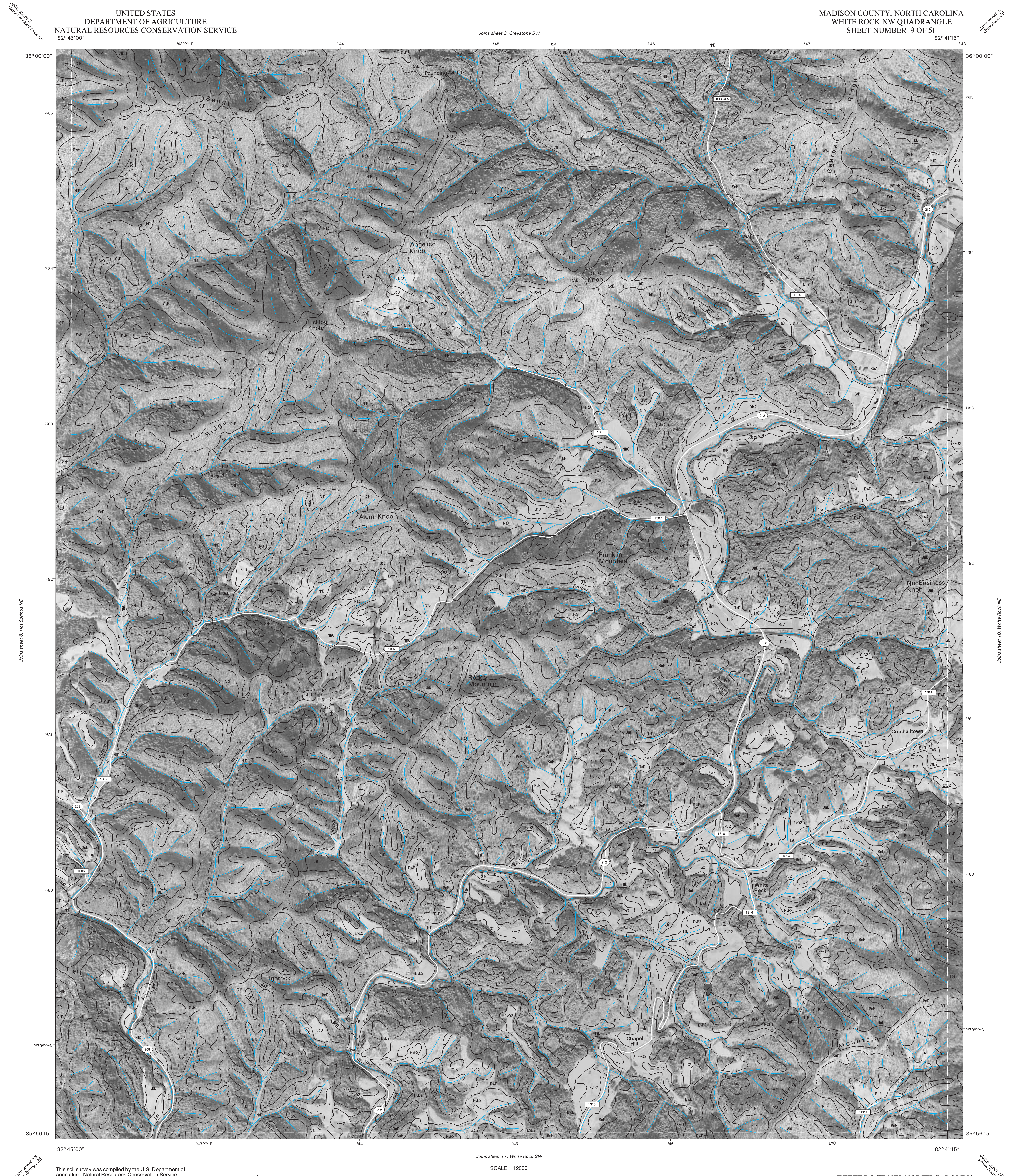
MADISON COUNTY, NORTH CAROLINA
WHITE ROCK NW QUADRANGLE
SHEET NUMBER 9 OF 51



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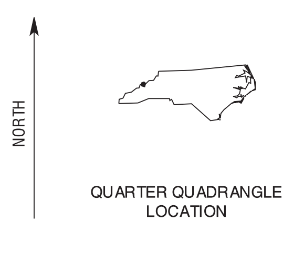

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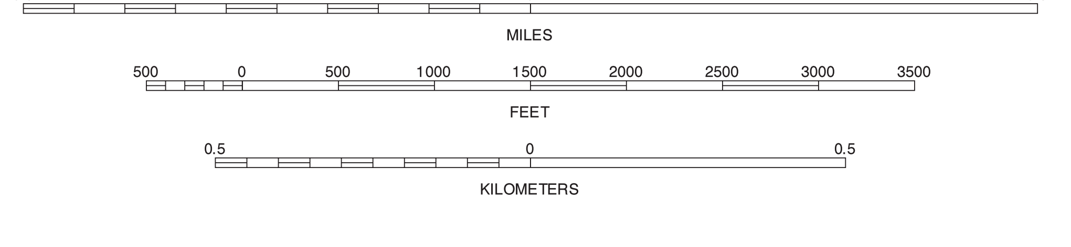

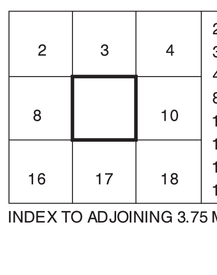

2 DAVY CROCKETT LAKE SE
3 GREYSTONE SW
4 GREYSTONE SE
8 HOT SPRINGS NE
10 WHITE ROCK NE
16 HOT SPRINGS SE
17 WHITE ROCK SW
18 WHITE ROCK SE

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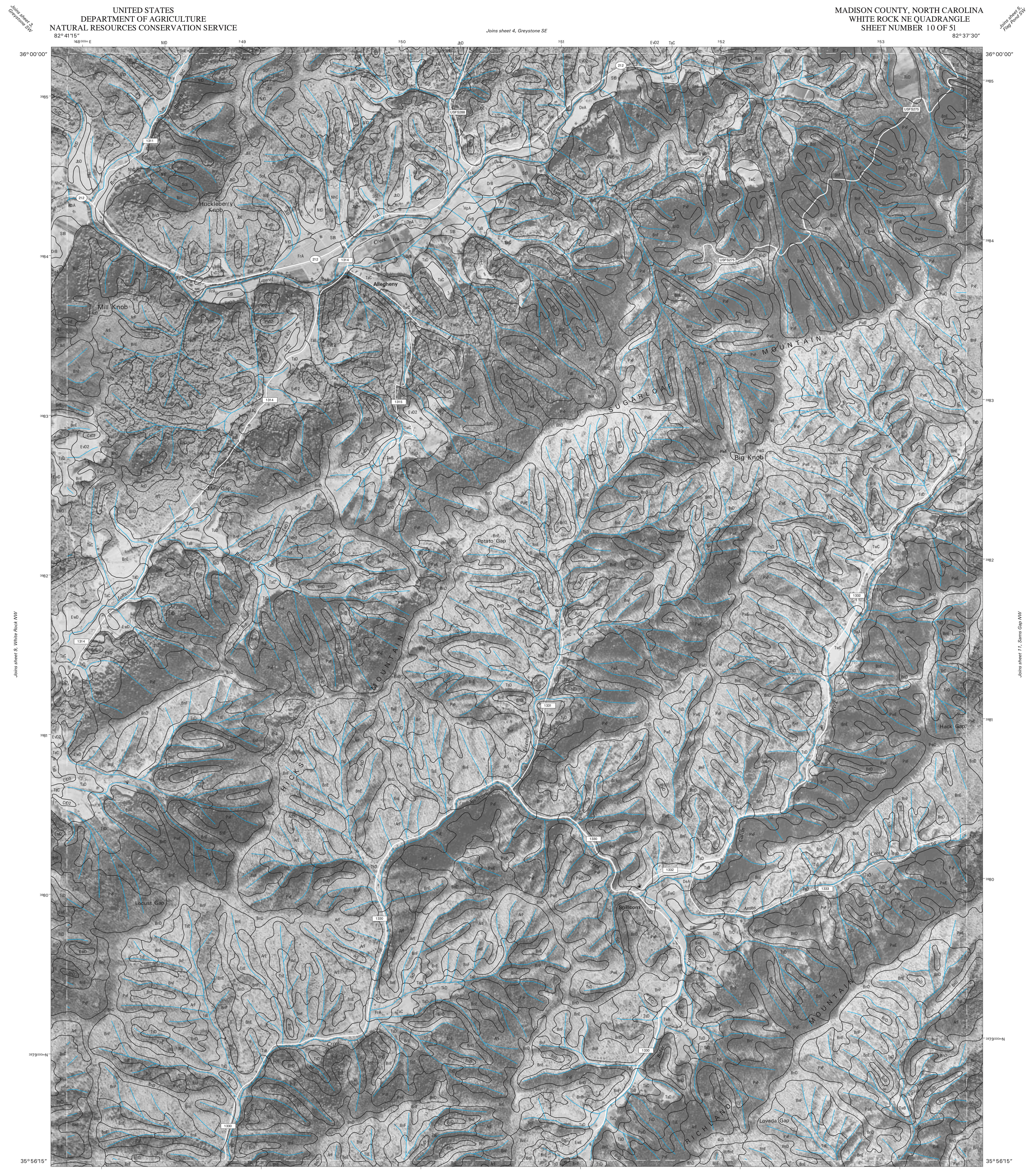
MADISON COUNTY, NORTH CAROLINA
WHITE ROCK NE QUADRANGLE
SHEET NUMBER 10 OF 51



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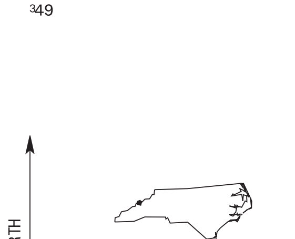
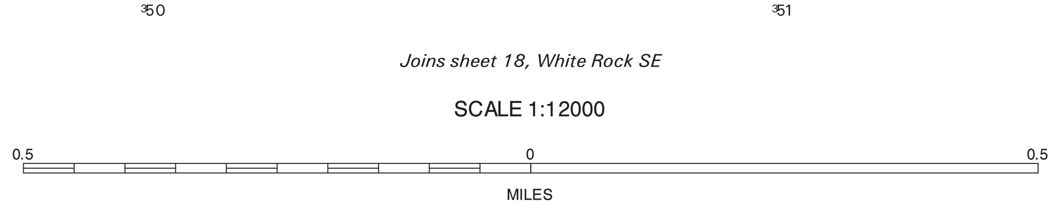


QUARTER QUADRANGLE LOCATION

SCALE 1:12000



3	4	5
9		11
17	18	19

3 GREYSTONE SW
4 GREYSTONE SE
5 FLAG POND SW
9 WHITE ROCK NW
11 SAMS GAP NW
17 WHITE ROCK SW
18 WHITE ROCK SE
19 SAMS GAP SW

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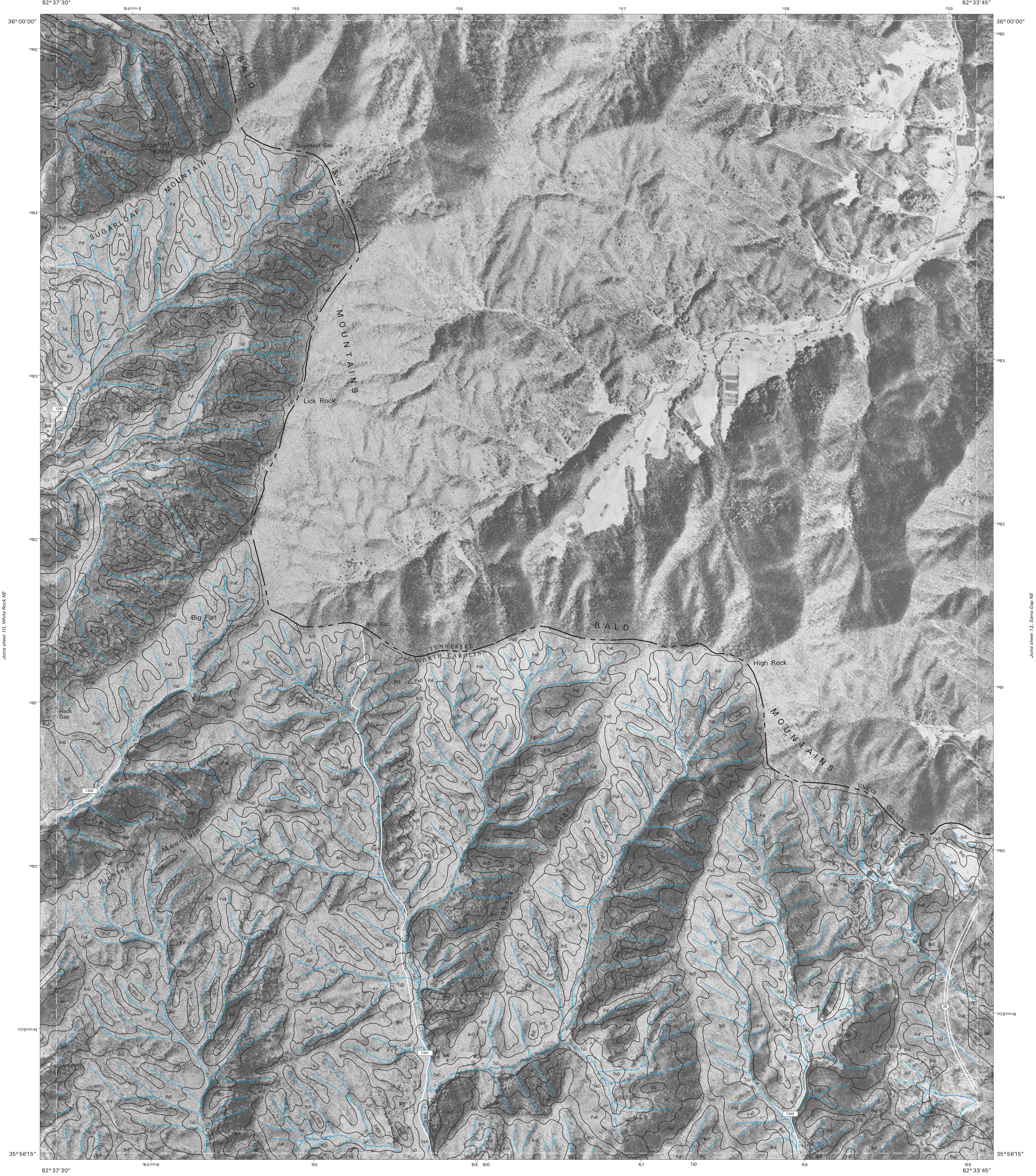
MADISON COUNTY, NORTH CAROLINA
SAMS GAP NW QUADRANGLE
SHEET NUMBER 11 OF 51

Joins sheet 4, Greystone SE

Joins sheet 5, Flag Pond SW



Joins sheet 18, White Rock SE

Joins sheet 20, Sams Gap SE

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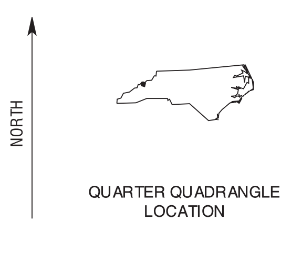
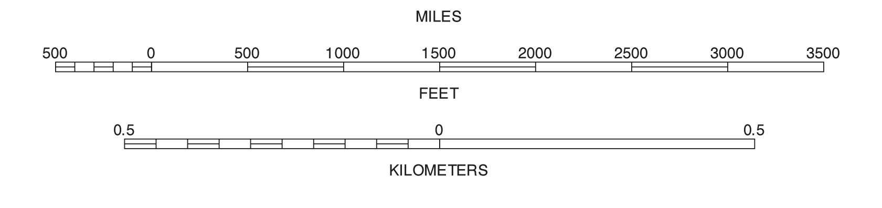


QUARTER QUADRANGLE
LOCATION

SCALE 1:12000



4	5	
10		12
18	19	20

4 GREYSTONE SE
5 FLAG POND SW
10 WHITE ROCK NE
12 SAMS GAP NE
18 WHITE ROCK SE
19 SAMS GAP SW
20 SAMS GAP SE

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Joins sheet 5, Flag Pond SW

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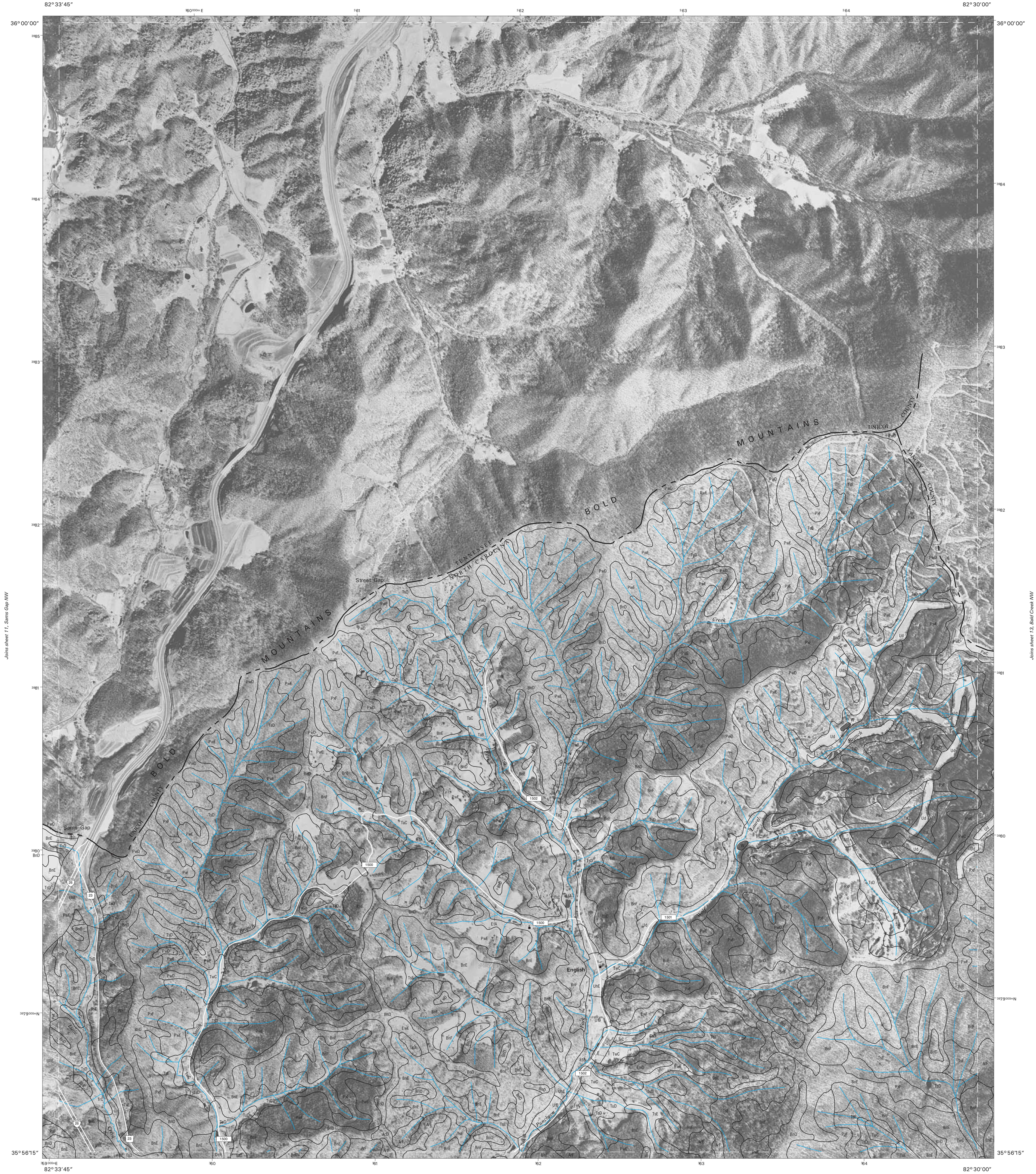
MADISON COUNTY, NORTH CAROLINA
SAMS GAP NE QUADRANGLE
SHEET NUMBER 12 OF 51



Joins sheet 20, Sams Gap SE

Joins sheet 19, Sams Gap SW

Joins sheet 21, Bald Creek SW

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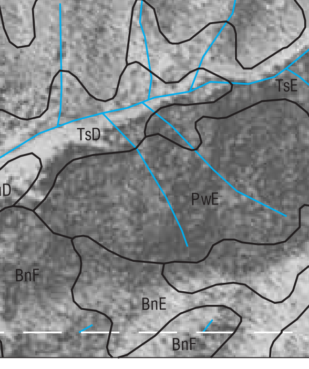
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE
LOCATION

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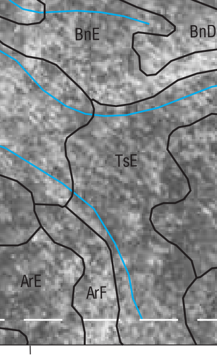
FEET

0.5 0 0.5
KILOMETERS



5 FLAG POND SW
11 SAMS GAP NW
13 BALD CREEK NW
19 SAMS GAP SW
20 SAMS GAP SE
21 BALD CREEK SW

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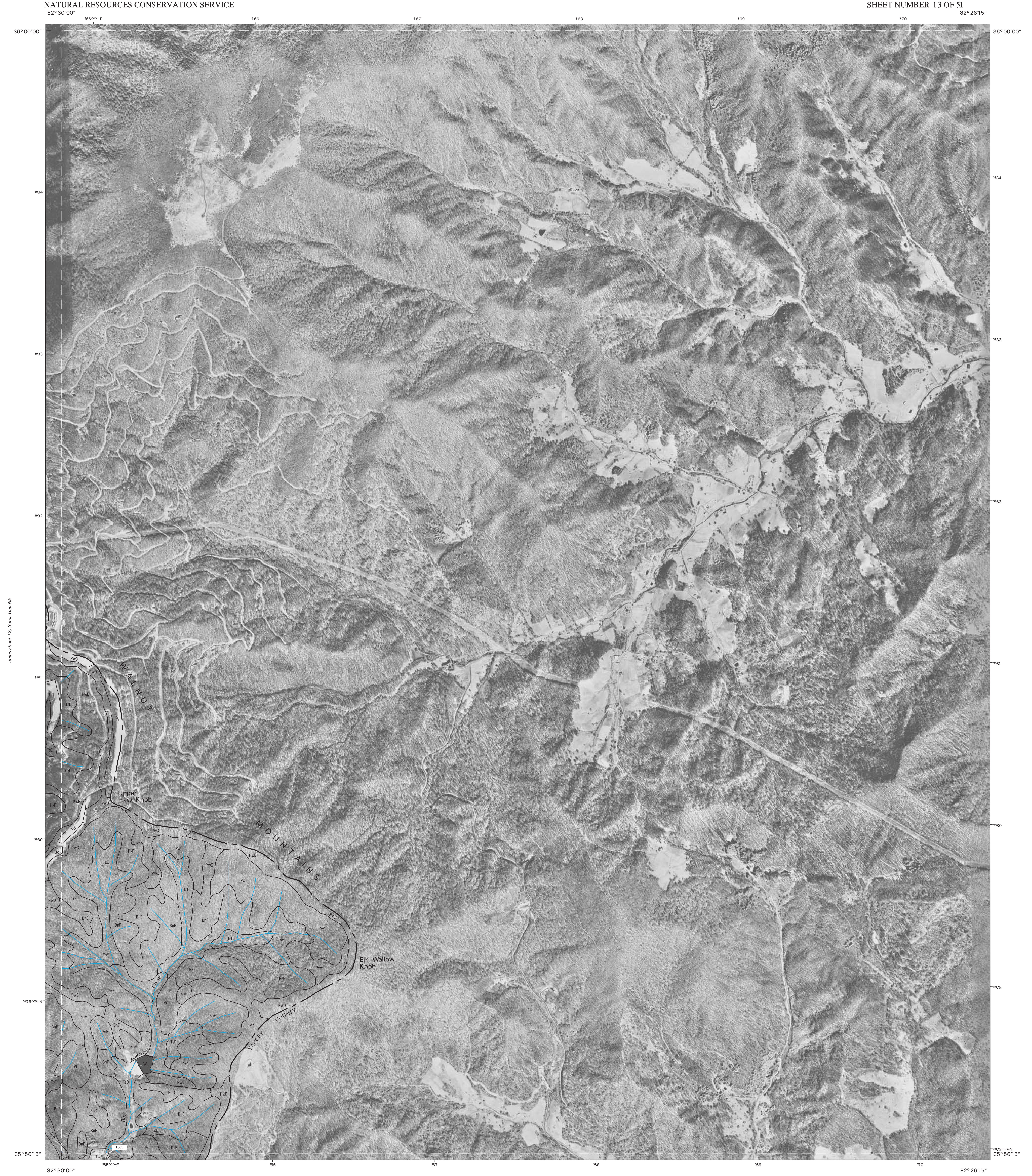
MADISON COUNTY, NORTH CAROLINA
BALD CREEK NW QUADRANGLE
SHEET NUMBER 13 OF 51



Joins sheet 21, Bald Creek SW

Joins sheet 20, Sams Gap SE

Joins sheet 22, Bald Creek SE

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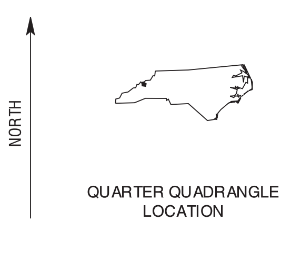
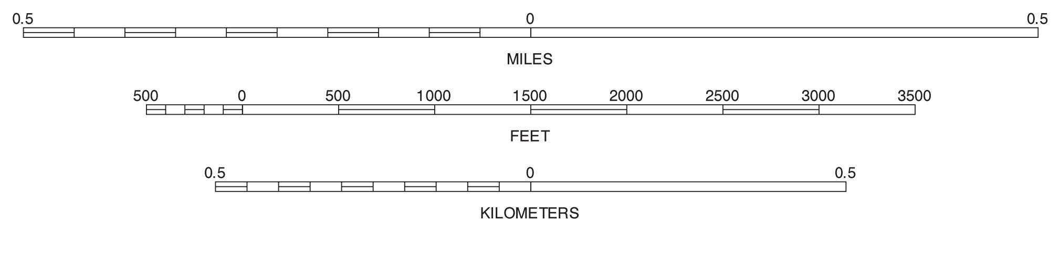
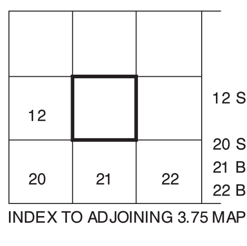


QUARTER QUADRANGLE
LOCATION

SCALE 1:12000





12 SAMS GAP NE
20 SAMS GAP SE
21 BALD CREEK SW
22 BALD CREEK SE

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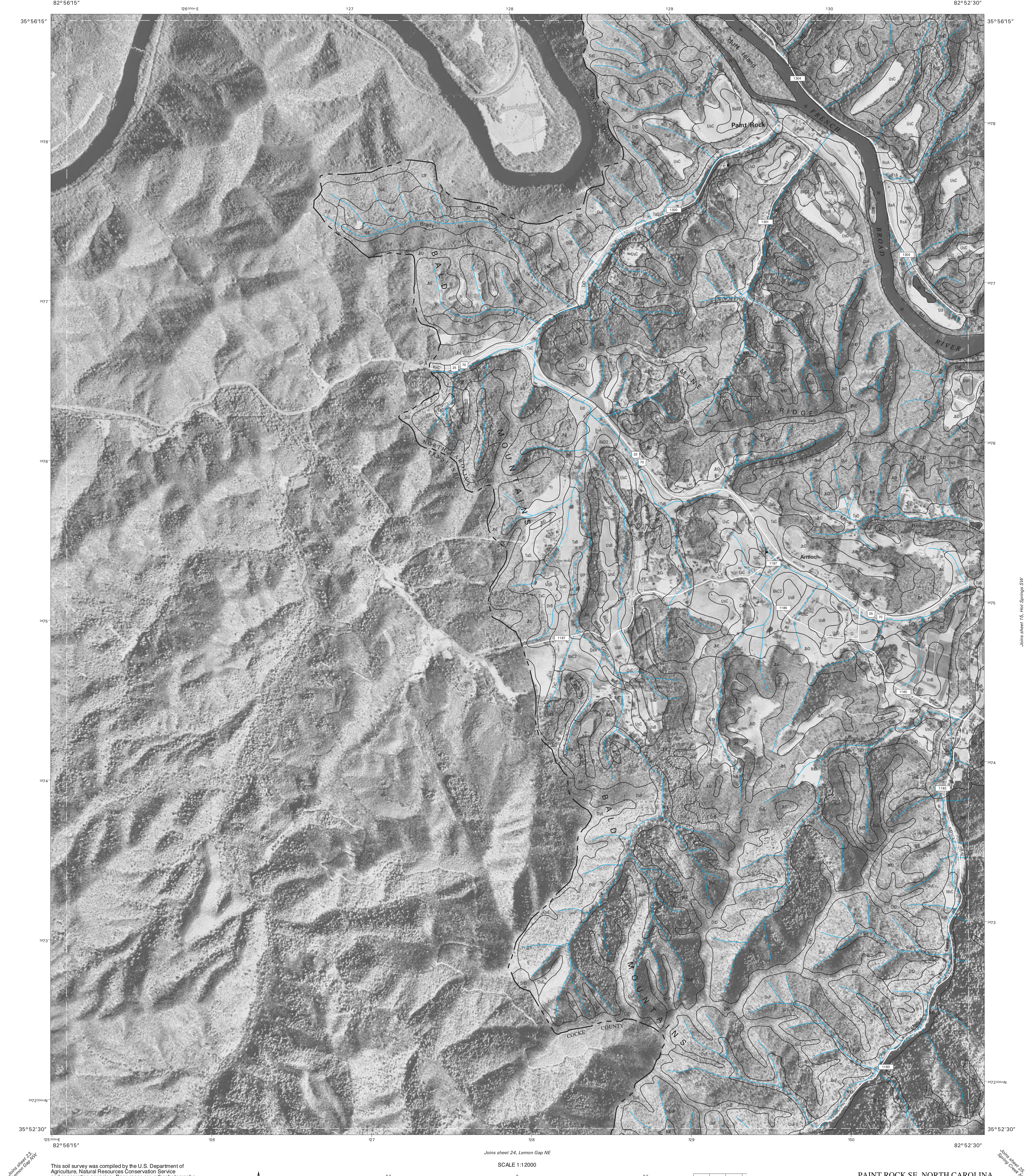
MADISON COUNTY, NORTH CAROLINA
PAINT ROCK SE QUADRANGLE
SHEET NUMBER 14 OF 51



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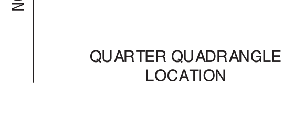

QUARTER QUADRANGLE
LOCATION

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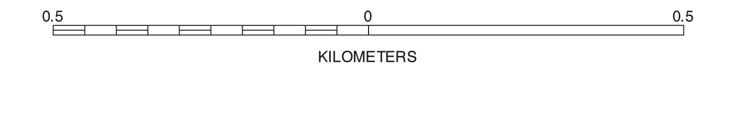

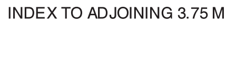

6 PAINT ROCK NE
7 HOT SPRINGS NW
15 HOT SPRINGS SW
23 LEMON GAP NW
24 LEMON GAP NE
25 SPRING CREEK NW

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HOT SPRINGS SW QUADRANGLE
SHEET NUMBER 15 OF 51

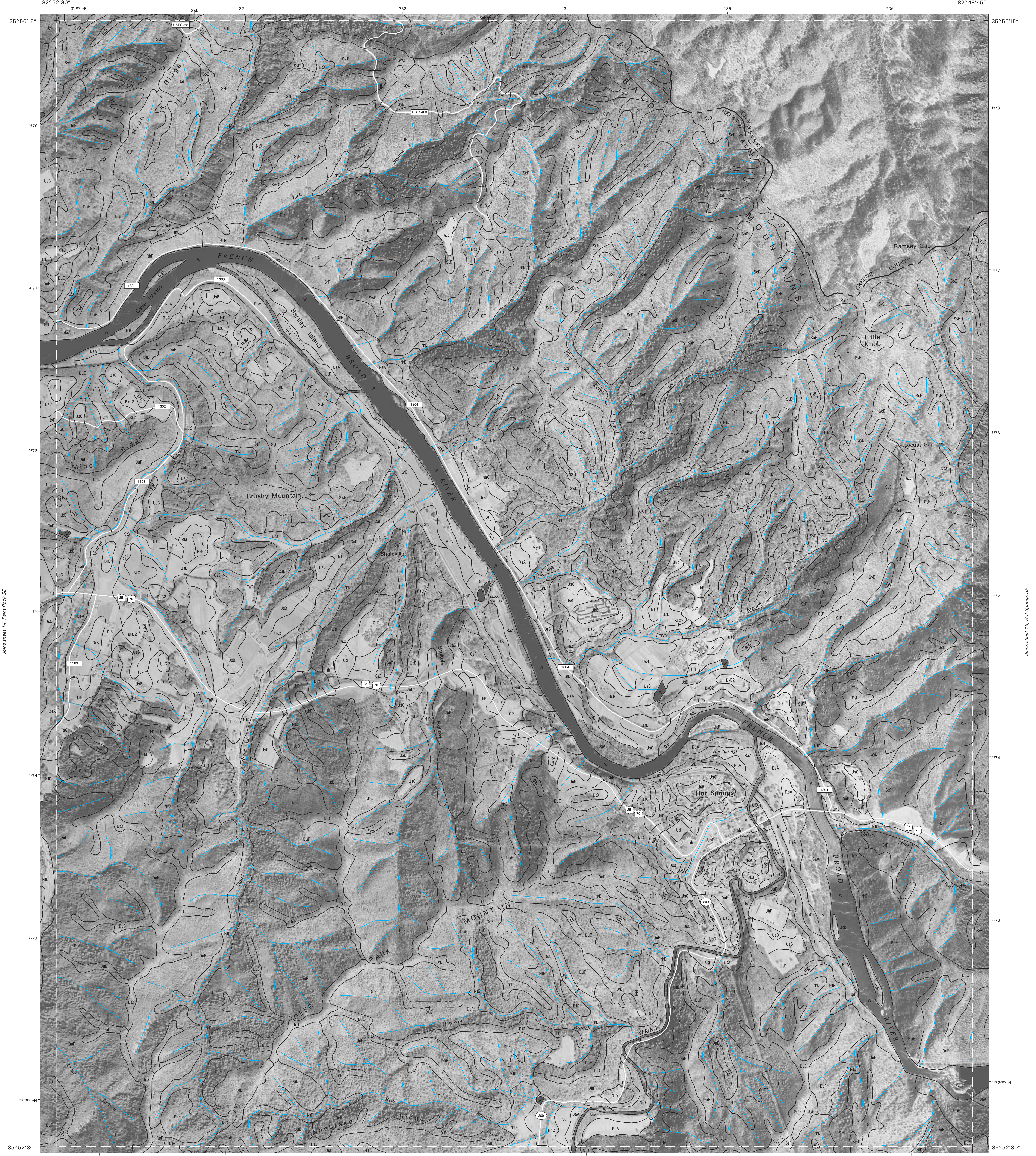
Joins sheet 6, Paint Rock NE

Joins sheet 7, Hot Springs NW

Joins sheet 8, Hot Springs NE

Joins sheet 14, Paint Rock SE

Joins sheet 16, Hot Springs SE



Joins sheet 24, Lemon Gap NE

Joins sheet 25, Spring Creek NW

Joins sheet 26, Spring Creek NE

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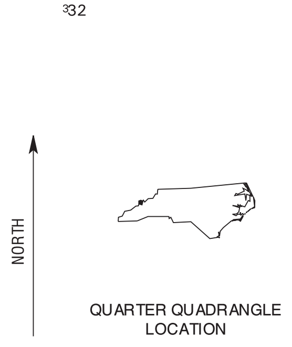
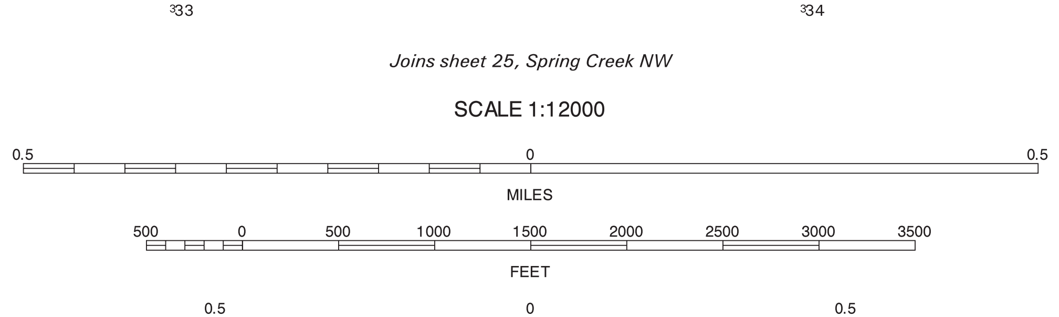


QUARTER QUADRANGLE
LOCATION

SCALE 1:12000



6	7	8
14		16
24	25	26

6 PAINT ROCK NE
7 HOT SPRINGS NW
8 HOT SPRINGS NE
14 PAINT ROCK SE
16 HOT SPRINGS SE
24 LEMON GAP NE
25 SPRING CREEK NW
26 SPRING CREEK NE

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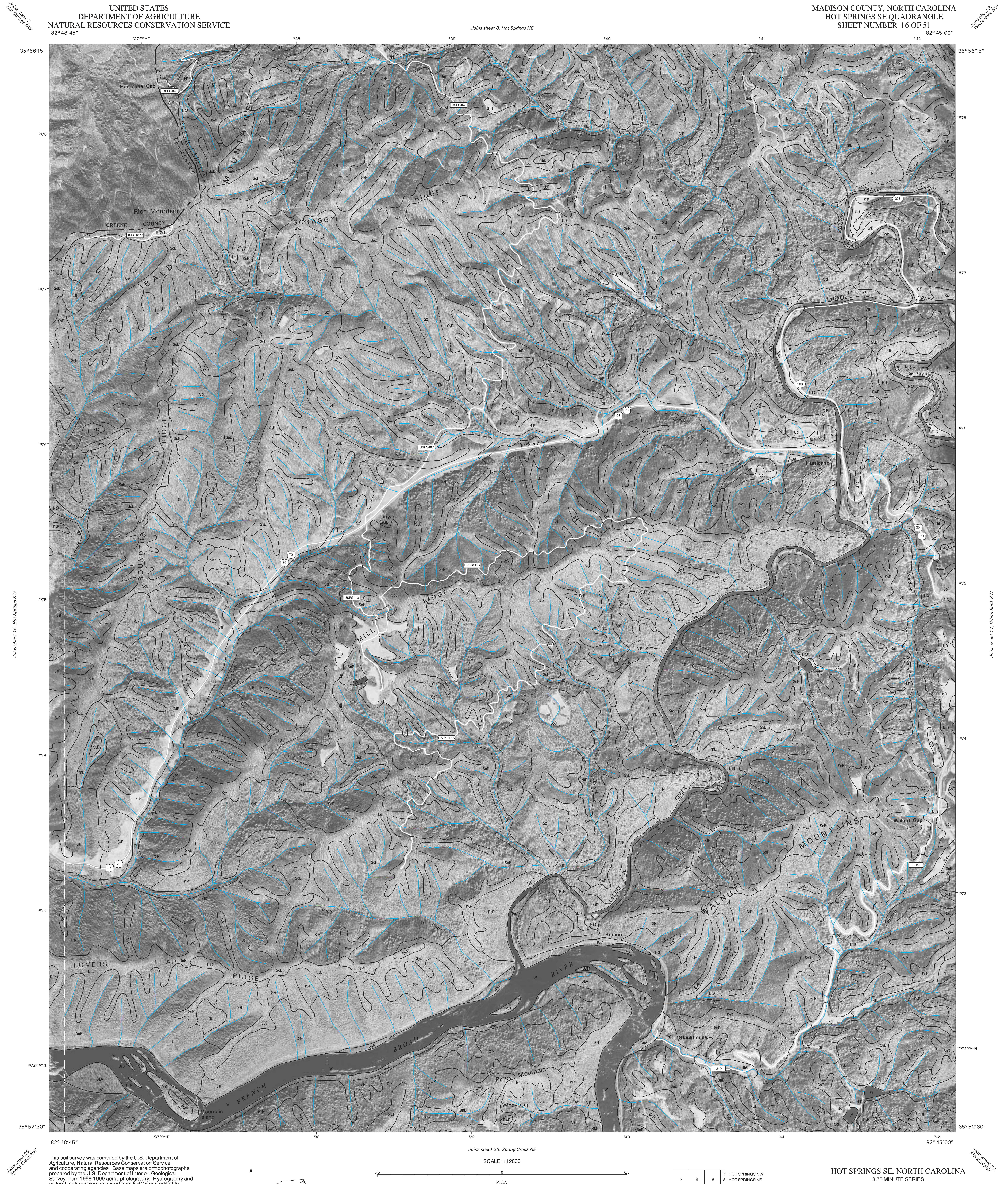
MADISON COUNTY, NORTH CAROLINA
HOT SPRINGS SE QUADRANGLE
SHEET NUMBER 16 OF 51



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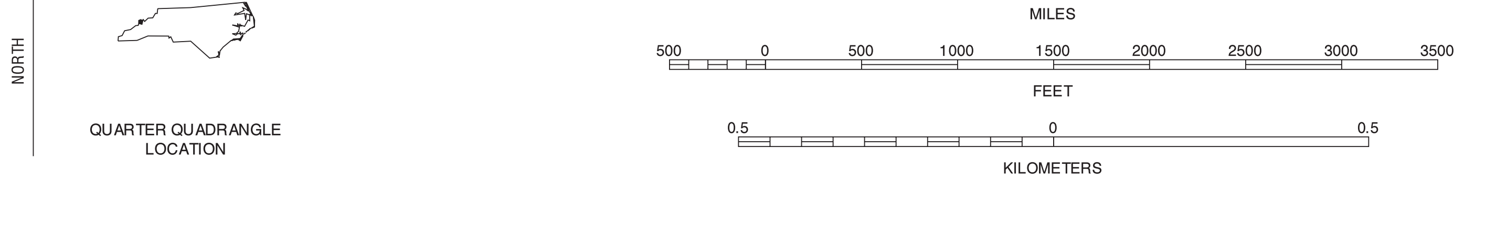

7	8	9
15		17
25	26	27

7 HOT SPRINGS NW
8 HOT SPRINGS NE
9 WHITE ROCK NW
15 HOT SPRINGS SW
17 WHITE ROCK SW
25 SPRING CREEK NW
26 SPRING CREEK NE
27 MARSHALL NW

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WHITE ROCK SW QUADRANGLE
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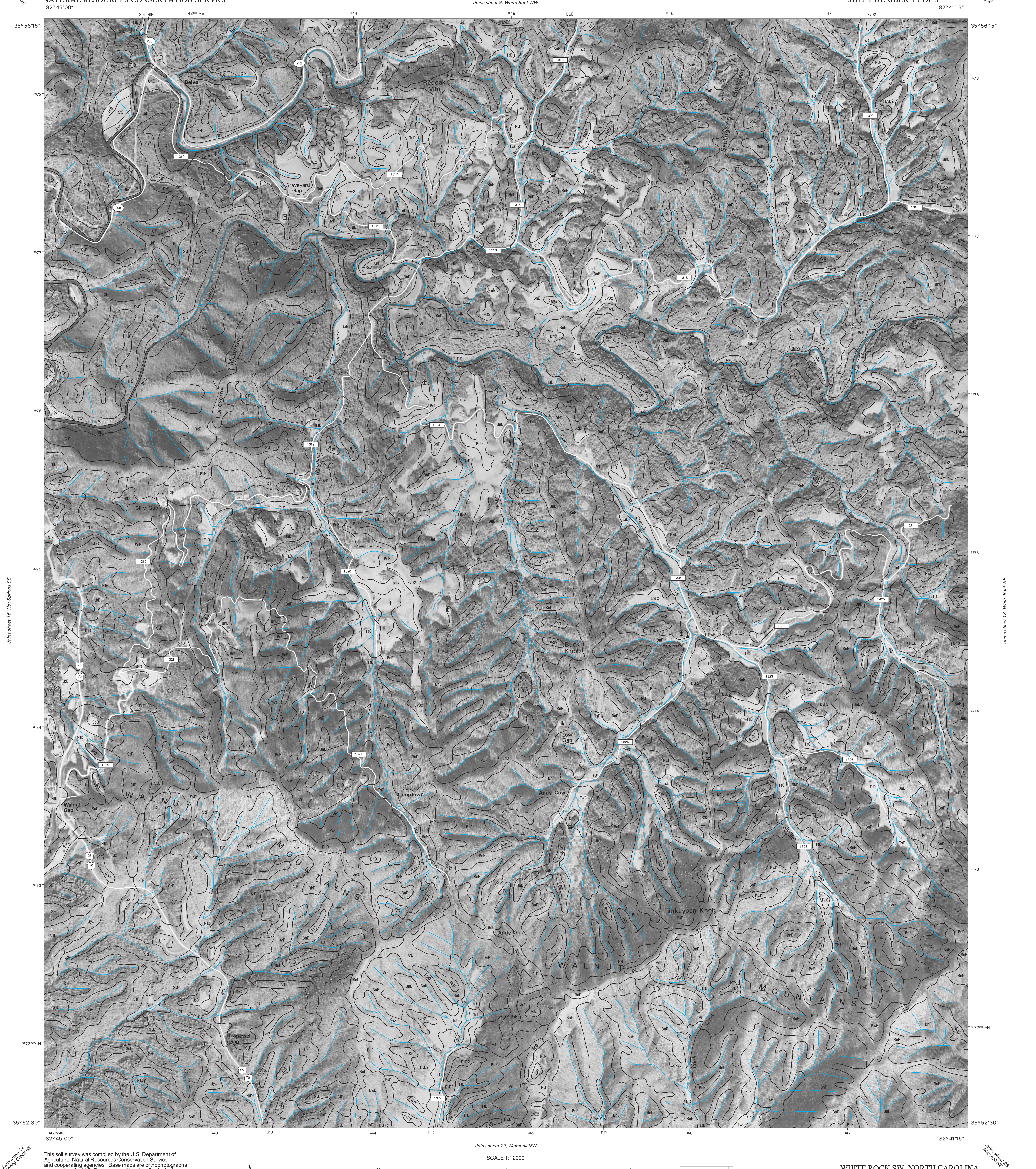

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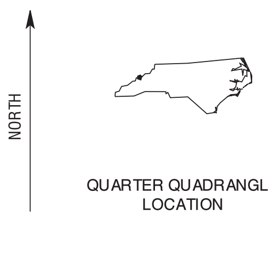

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

8	9	10
16		18
26	27	28

8 HOT SPRINGS NE
9 WHITE ROCK NW
10 WHITE ROCK NE
16 HOT SPRINGS SE
18 WHITE ROCK SE
26 SPRING CREEK NE
27 MARSHALL NW
28 MARSHALL NE

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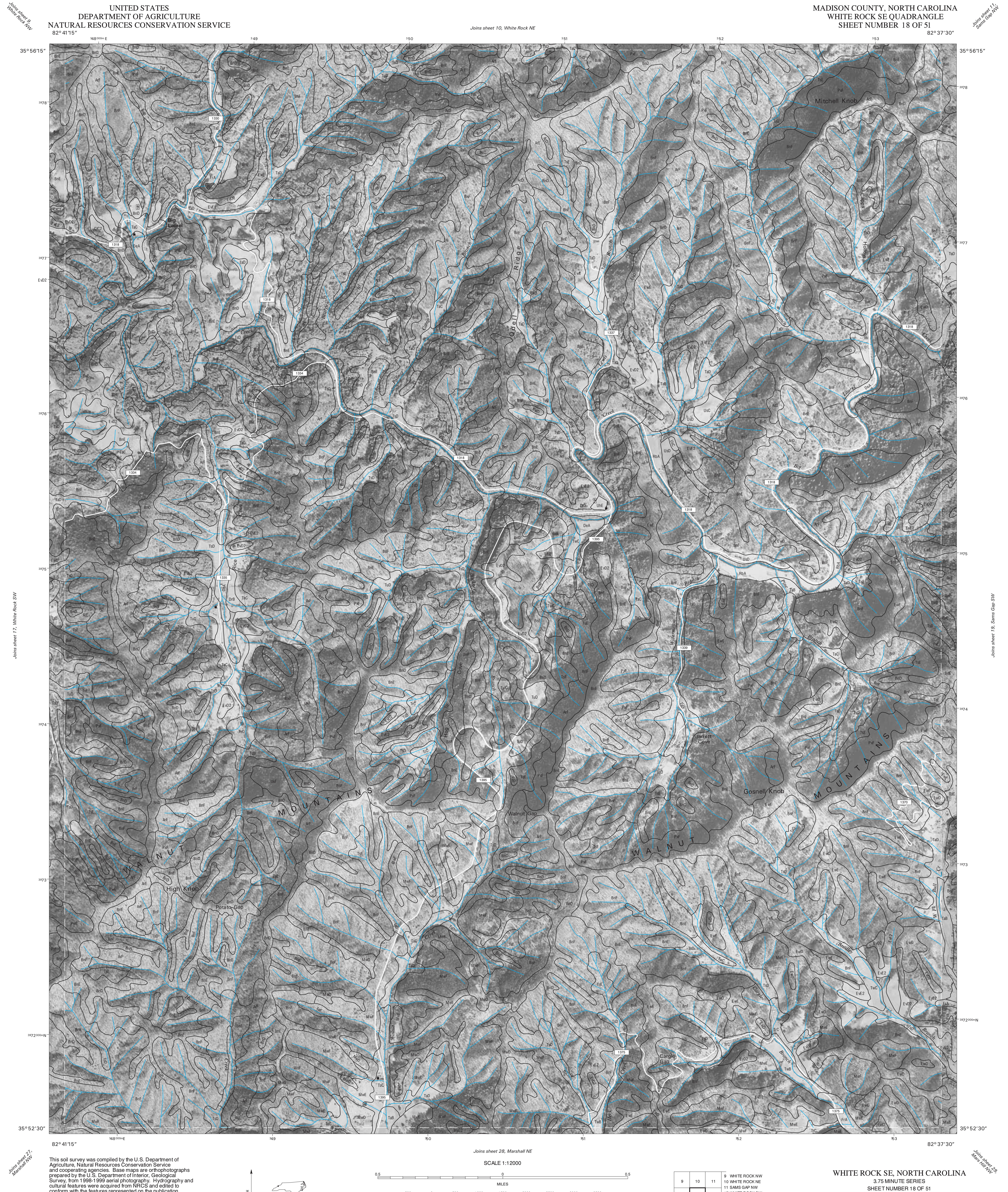
MADISON COUNTY, NORTH CAROLINA
WHITE ROCK SE QUADRANGLE
SHEET NUMBER 18 OF 51



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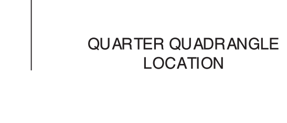
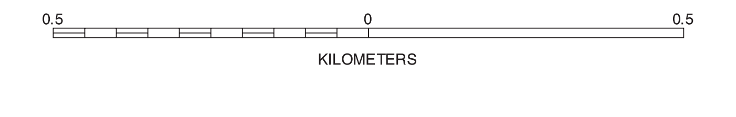
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE
LOCATION

SCALE 1:12000



9	10	11
17		19
27	28	29

9 WHITE ROCK NW
10 WHITE ROCK NE
11 SAMS GAP NW
17 WHITE ROCK SW
19 SAMS GAP SW
27 MARSHALL NW
28 MARSHALL NE
29 MARS HILL NW

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WHITE ROCK SE, NORTH CAROLINA

3.75 MINUTE SERIES
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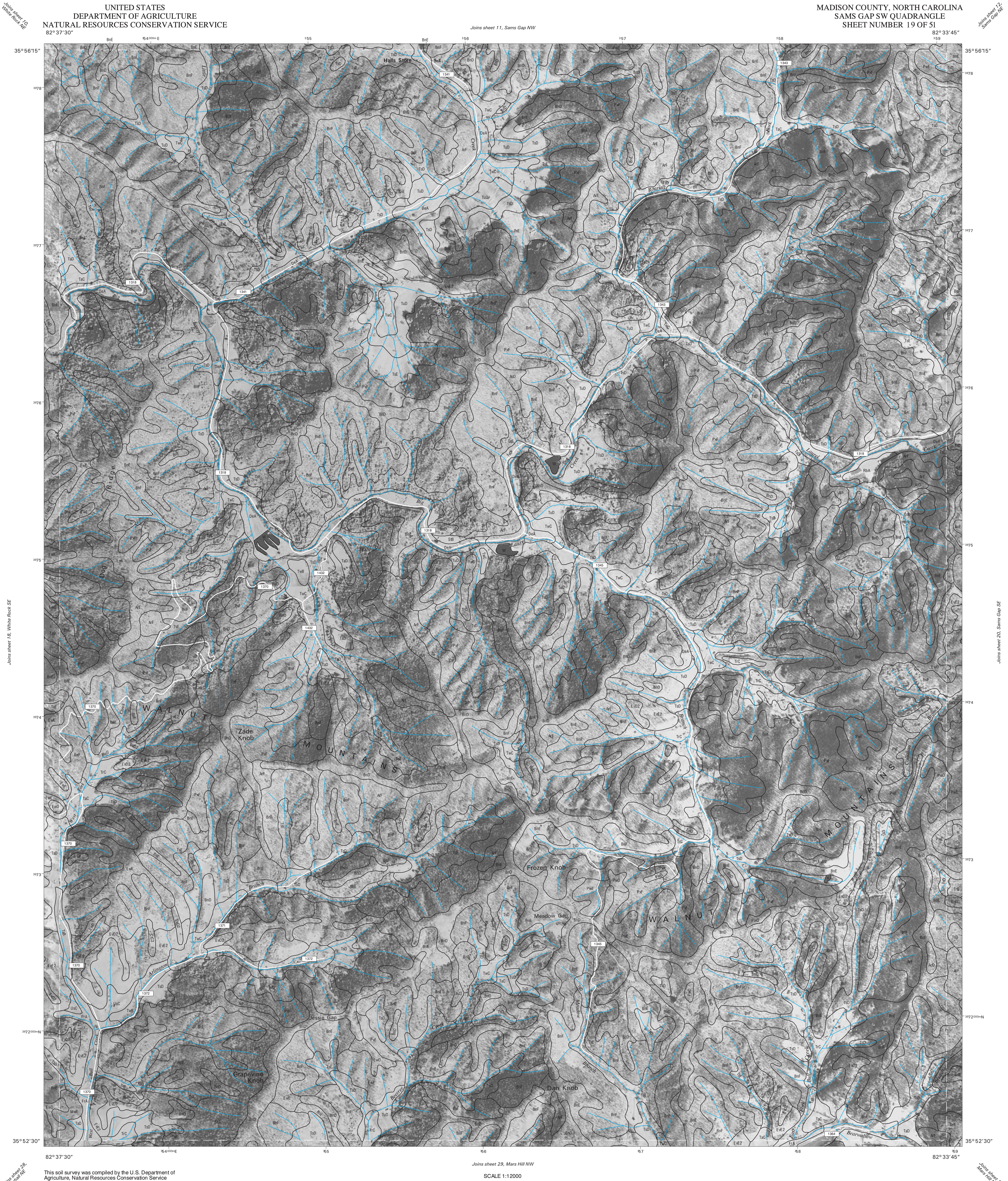
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MADISON COUNTY, NORTH CAROLINA
SAMS GAP SW QUADRANGLE
SHEET NUMBER 19 OF 51



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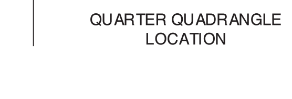
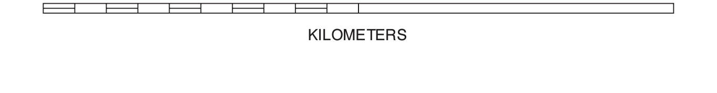


QUARTER QUADRANGLE
LOCATION

SCALE 1:12000



10	11	12
18		20
28	29	30

10 WHITE ROCK NE
11 SAMS GAP NW
12 SAMS GAP NE
18 WHITE ROCK SE
20 SAMS GAP SE
28 MARSHALL NE
29 MARS HILL NW
30 MARS HILL NE

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SAMS GAP SW, NORTH CAROLINA

3.75 MINUTE SERIES
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UNITED STATES
DEPARTMENT OF AGRICULTURE
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MADISON COUNTY, NORTH CAROLINA
SAMS GAP SE QUADRANGLE
SHEET NUMBER 20 OF 51

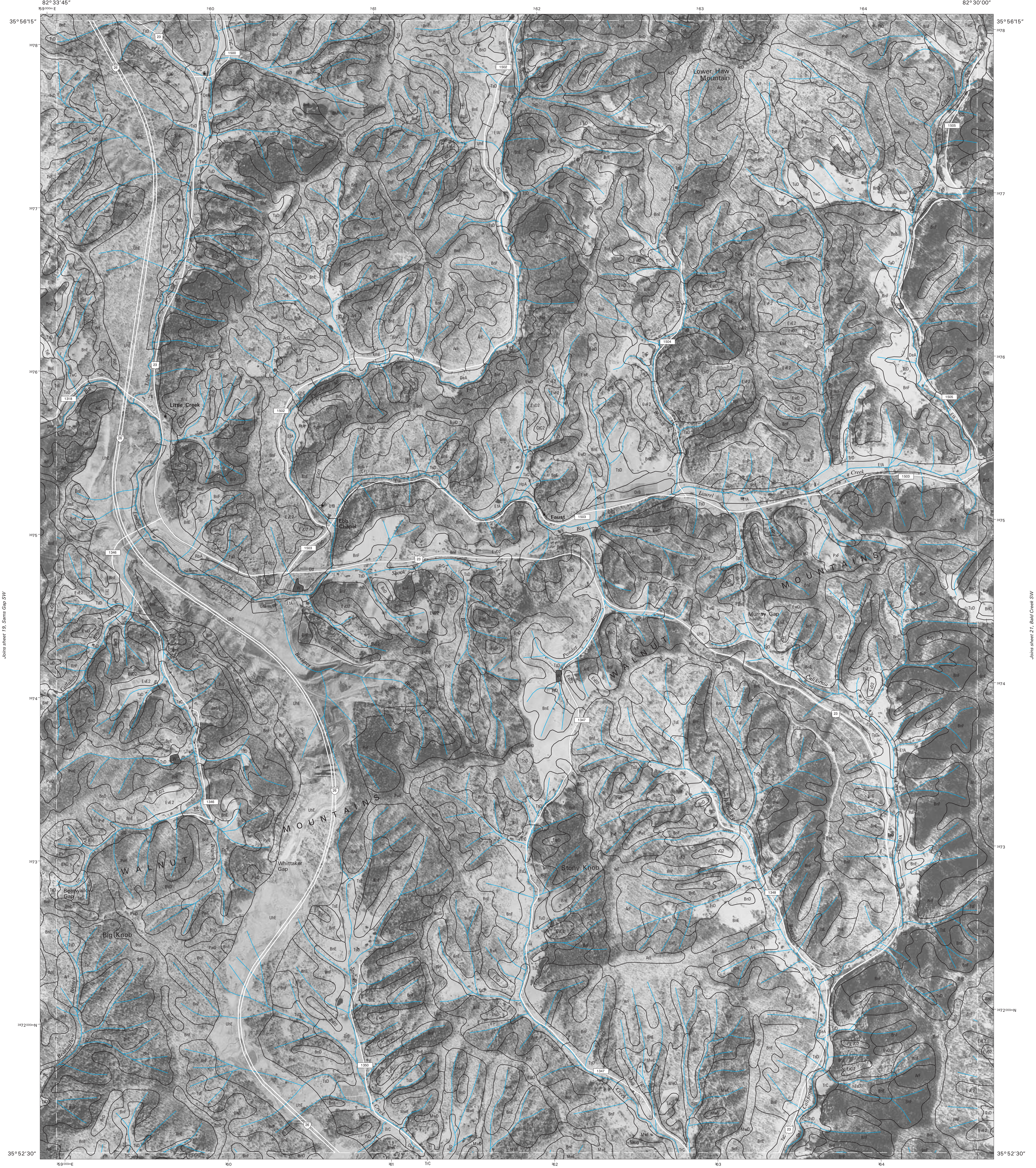
Joins sheet 11, Sams Gap NW

Joins sheet 12, Sams Gap NE

Joins sheet 13, Bald Creek NW

Joins sheet 19, Sams Gap SW

Joins sheet 21, Bald Creek SW



Joins sheet 29, Mars Hill NW

Joins sheet 30, Mars Hill NE

Joins sheet 31, Barnardsville NW

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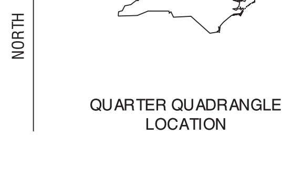
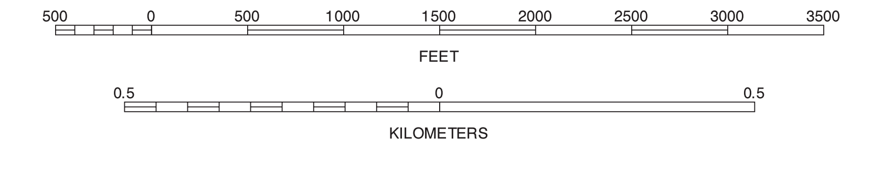


QUARTER QUADRANGLE LOCATION

SCALE 1:12000



11	12	13
19		21
29	30	31

11 SAMS GAP NW
12 SAMS GAP NE
13 BALD CREEK NW
19 SAMS GAP SW
21 BALD CREEK SW
29 MARS HILL NW
30 MARS HILL NE
31 BARNARDSVILLE NW

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SAMS GAP SE, NORTH CAROLINA

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UNITED STATES
DEPARTMENT OF AGRICULTURE
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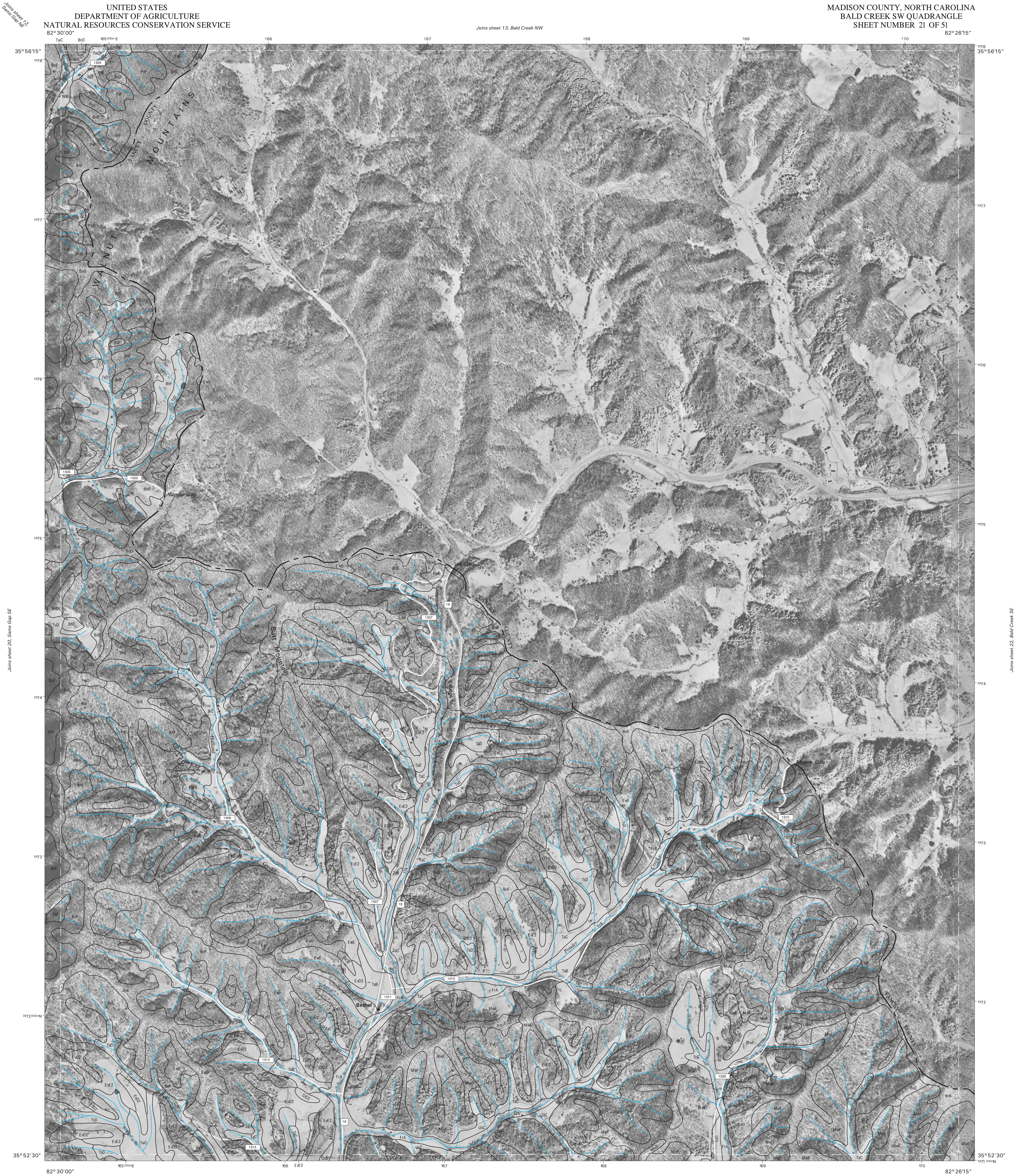
MADISON COUNTY, NORTH CAROLINA
BALD CREEK SW QUADRANGLE
SHEET NUMBER 21 OF 51



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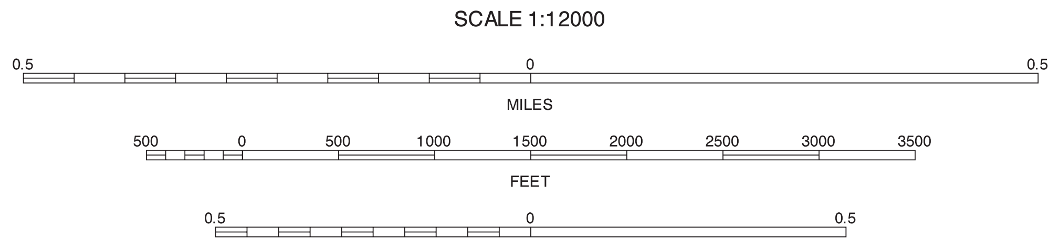
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

QUARTER QUADRANGLE LOCATION

SCALE 1:12000



12	13	
20		22
30	31	32

12 SAMS GAP NE
13 BALD CREEK NW

20 SAMS GAP SE
22 BALD CREEK SE
30 MARS HILL NE
31 BARNARDSVILLE NW
32 BARNARDSVILLE NE

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BALD CREEK SW, NORTH CAROLINA

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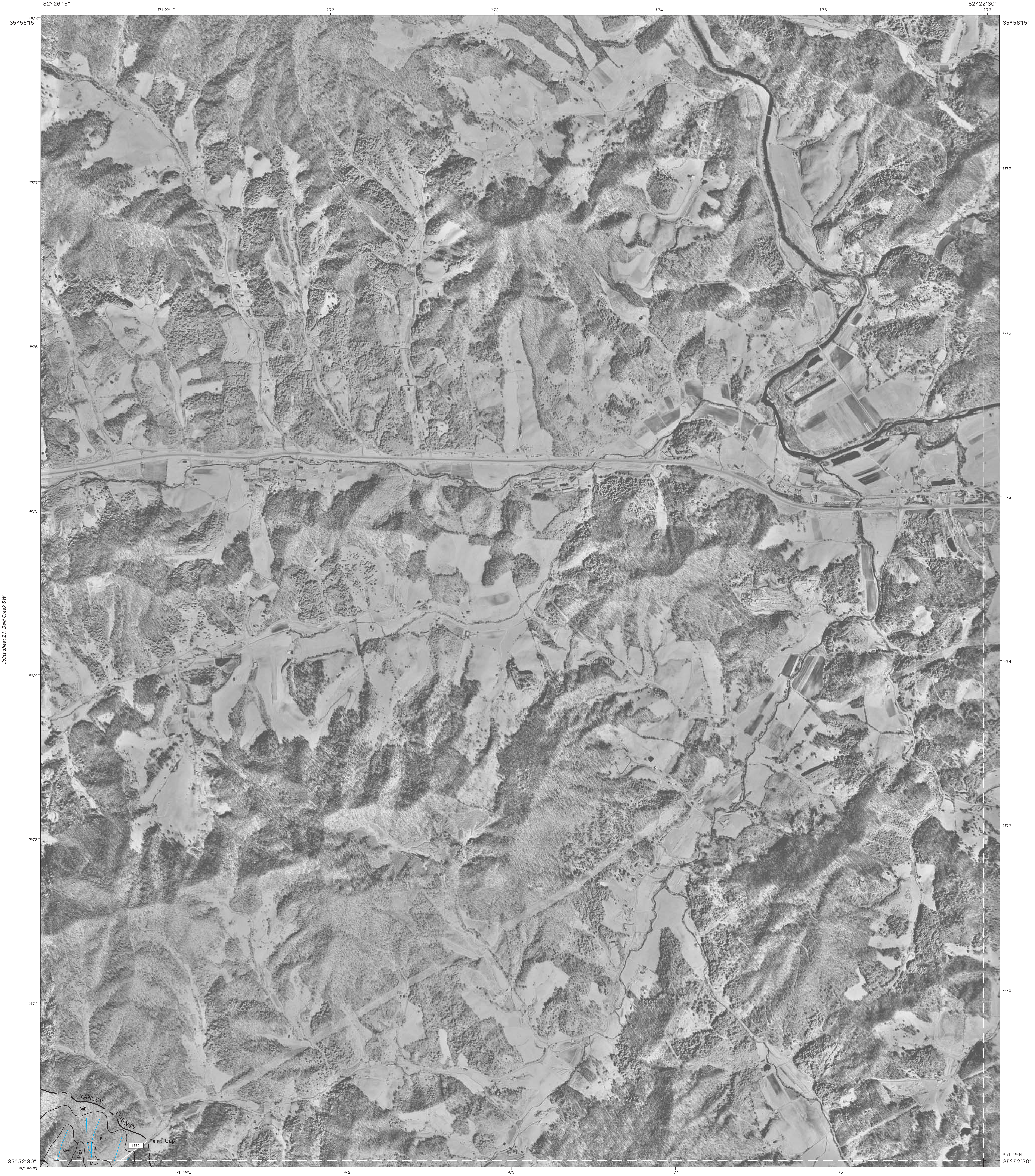
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

Joins sheet 13, Bald Creek NW

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MADISON COUNTY, NORTH CAROLINA
BALD CREEK SE QUADRANGLE
SHEET NUMBER 22 OF 51

Joins sheet 21, Bald Creek SW



Joins sheet 32, Barnardsville NE

Joins sheet 31, Barnardsville NW

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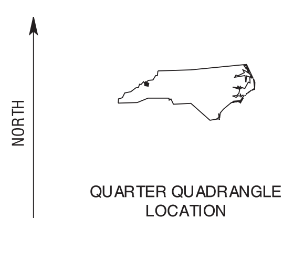
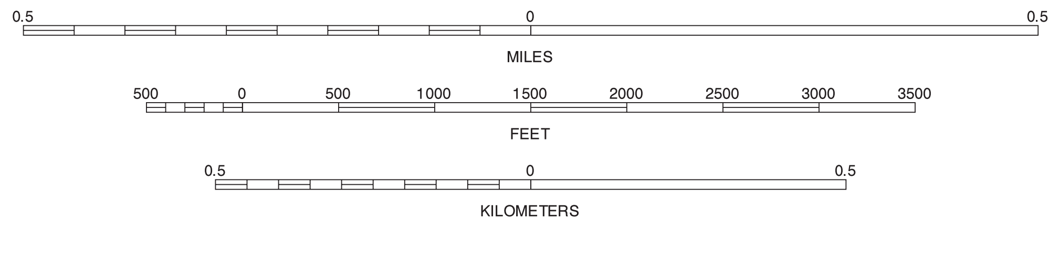
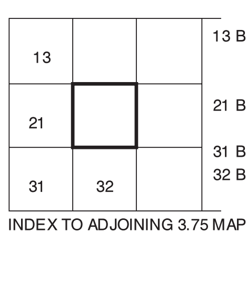
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE
LOCATION

SCALE 1:12000





13 BALD CREEK NW
21 BALD CREEK SW
31 BARNARDSVILLE NW
32 BARNARDSVILLE NE

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BALD CREEK SE, NORTH CAROLINA

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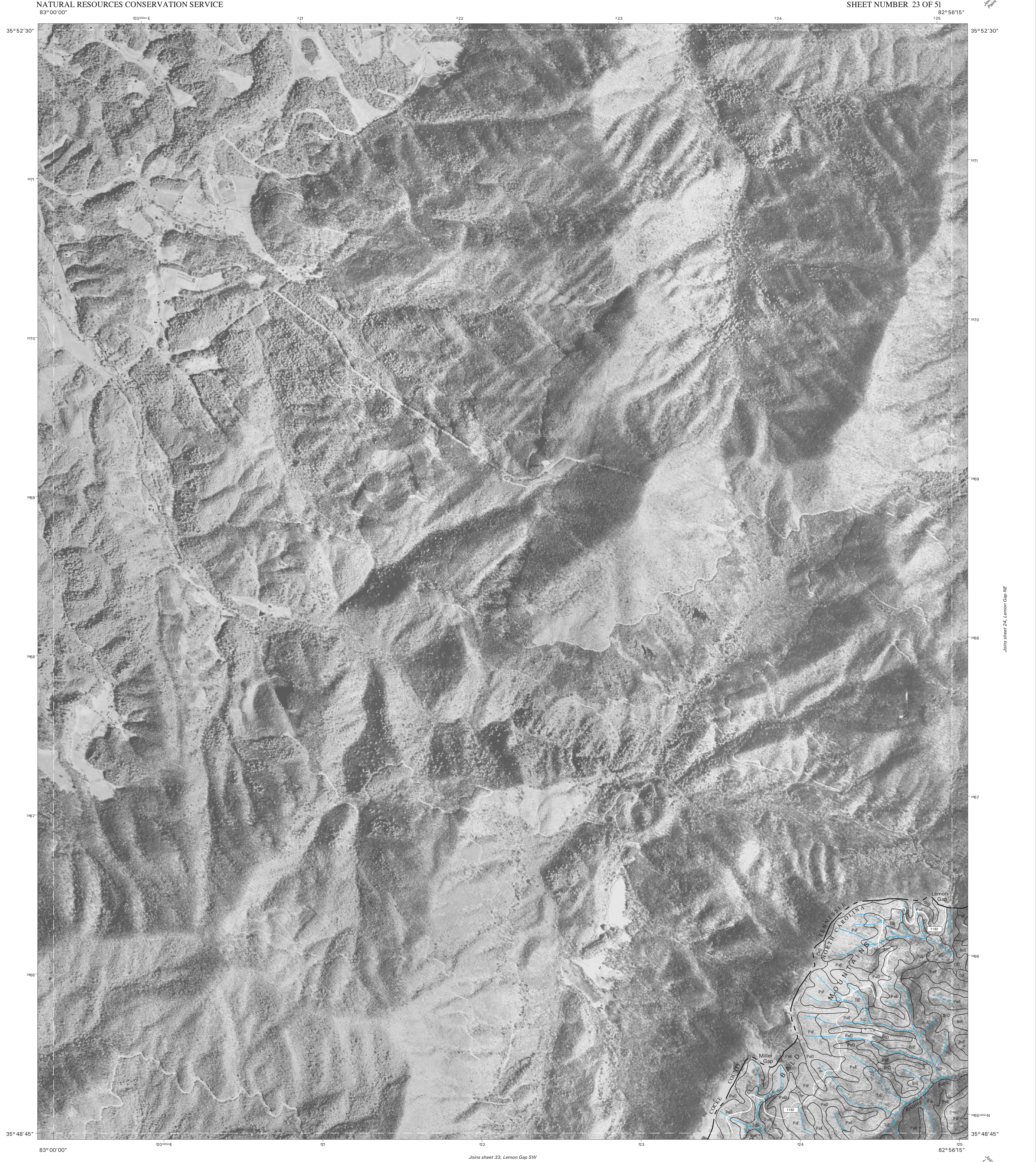
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MADISON COUNTY, NORTH CAROLINA
LEMON GAP NW QUADRANGLE
SHEET NUMBER 23 OF 51



Joins sheet 33, Lemon Gap SW

Joins sheet 34, Lemon Gap SE

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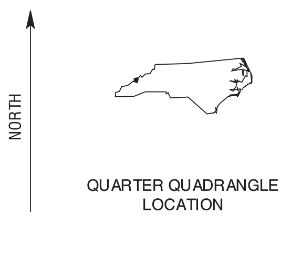
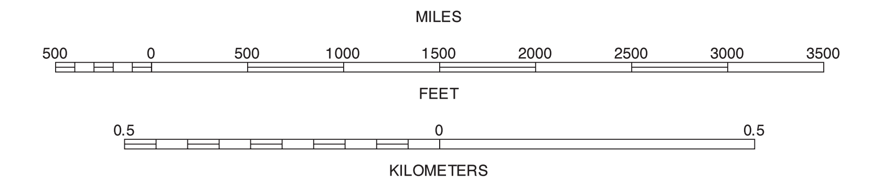
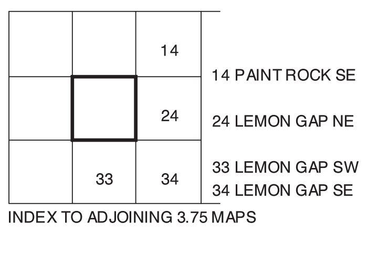


QUARTER QUADRANGLE
LOCATION

SCALE 1:12000





14 PAINT ROCK SE
24 LEMON GAP NE
33 LEMON GAP SW
34 LEMON GAP SE

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DEPARTMENT OF AGRICULTURE
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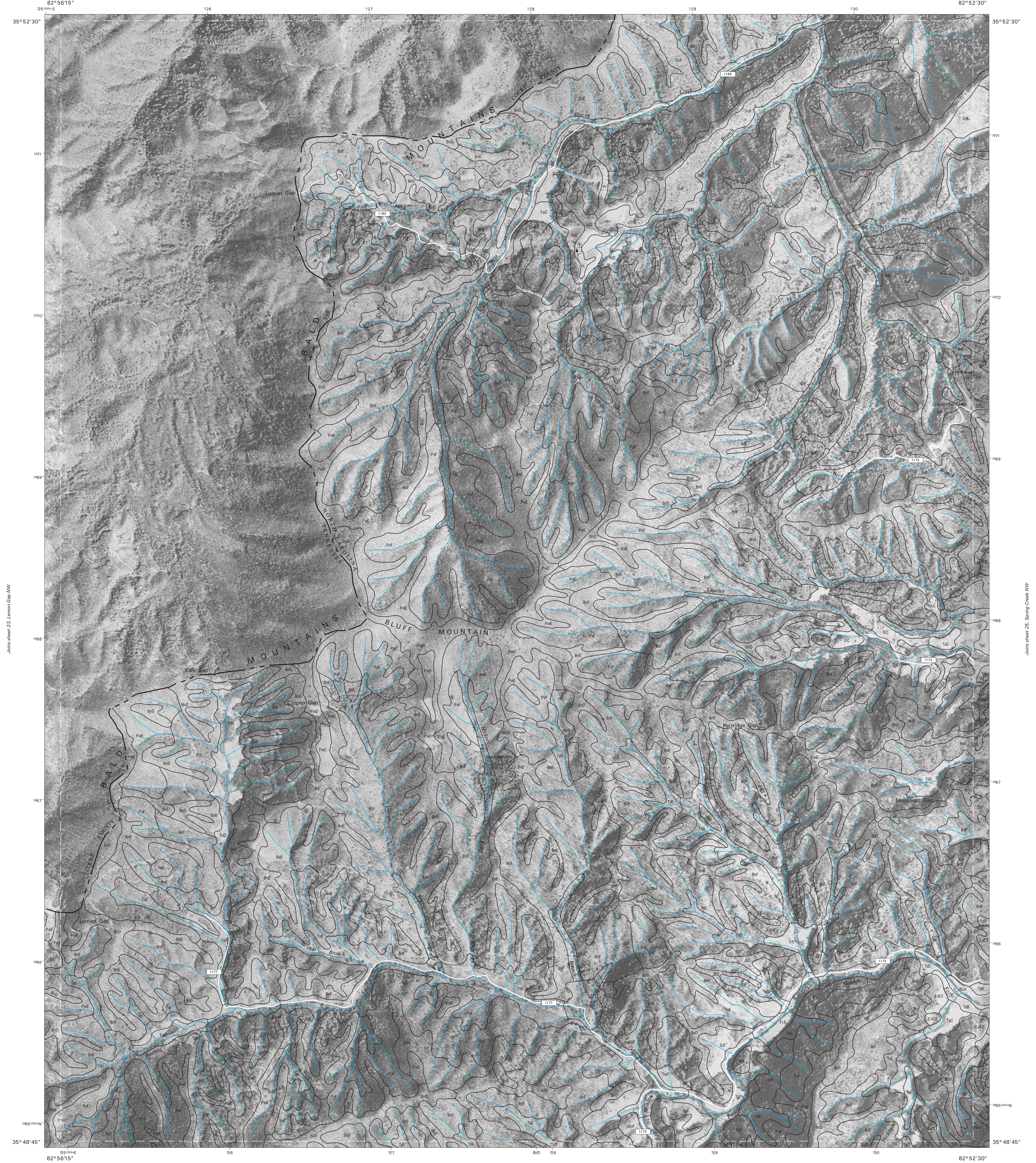
MADISON COUNTY, NORTH CAROLINA
LEMON GAP NE QUADRANGLE
SHEET NUMBER 24 OF 51



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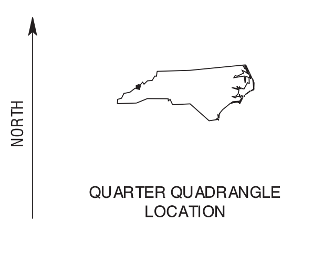

QUARTER QUADRANGLE LOCATION

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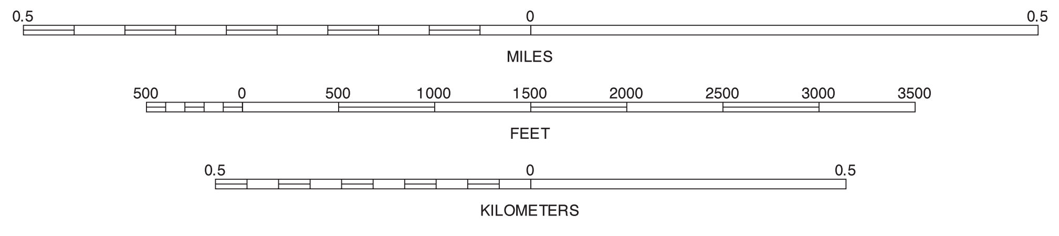

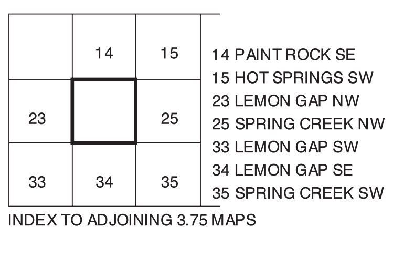

14 PAINT ROCK SE
15 HOT SPRINGS SW
23 LEMON GAP NW
25 SPRING CREEK NW
33 LEMON GAP SW
34 LEMON GAP SE
35 SPRING CREEK SW

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LEMON GAP NE, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 24 OF 51

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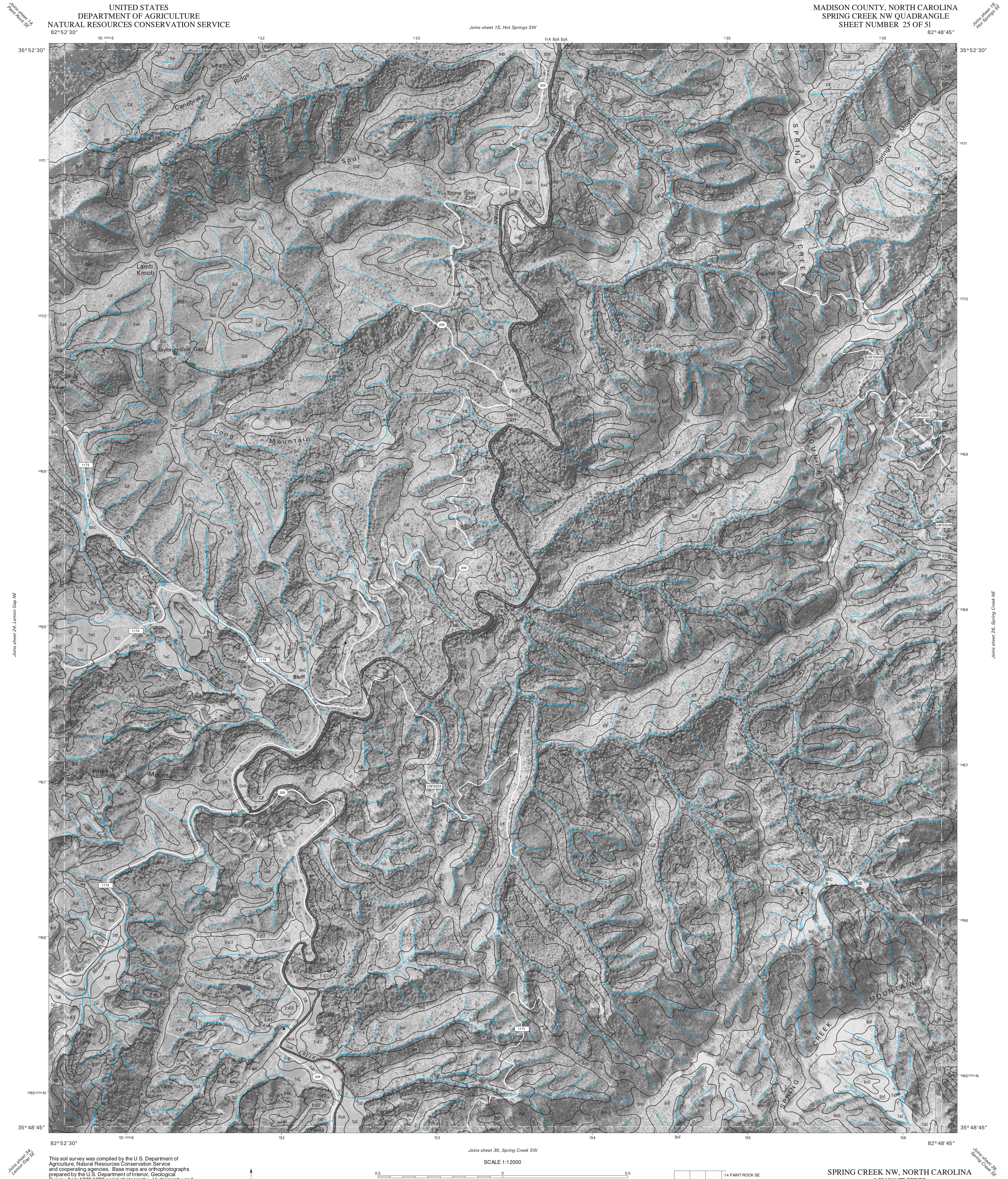
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MADISON COUNTY, NORTH CAROLINA
SPRING CREEK NW QUADRANGLE
SHEET NUMBER 25 OF 51



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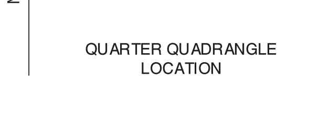

QUARTER QUADRANGLE LOCATION

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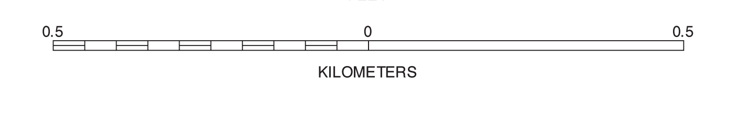

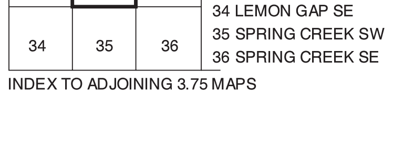

14 PAINT ROCK SE
15 HOT SPRINGS SW
16 HOT SPRINGS SE
24 LEMON GAP NE
26 SPRING CREEK NE
34 LEMON GAP SE
35 SPRING CREEK SW
36 SPRING CREEK SE

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Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

Joins sheet 15, Hot Springs SW

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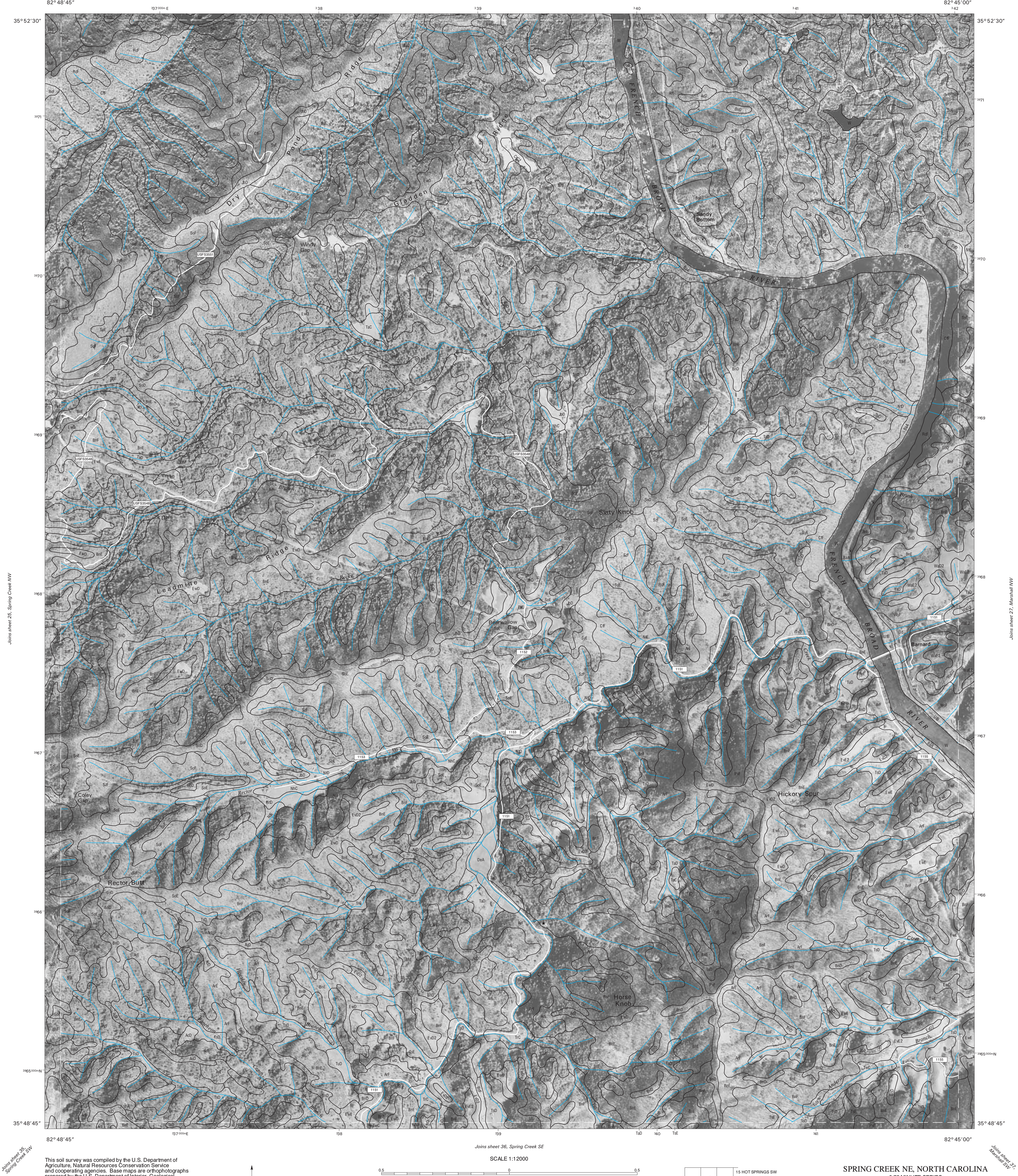
MADISON COUNTY, NORTH CAROLINA
SPRING CREEK NE QUADRANGLE
SHEET NUMBER 26 OF 51

Joins sheet 17, White Rock SW

Joins sheet 16, Hot Springs SE



Joins sheet 36, Spring Creek SE

Joins sheet 35, Spring Creek SW

Joins sheet 37, Marshall SW

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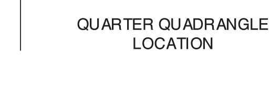
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

15	16	17
25		27
35	36	37

15 HOT SPRINGS SW
16 HOT SPRINGS SE
17 WHITE ROCK SW
25 SPRING CREEK NW
27 MARSHALL NW
35 SPRING CREEK SW
36 SPRING CREEK SE
37 MARSHALL SW

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UNITED STATES
DEPARTMENT OF AGRICULTURE
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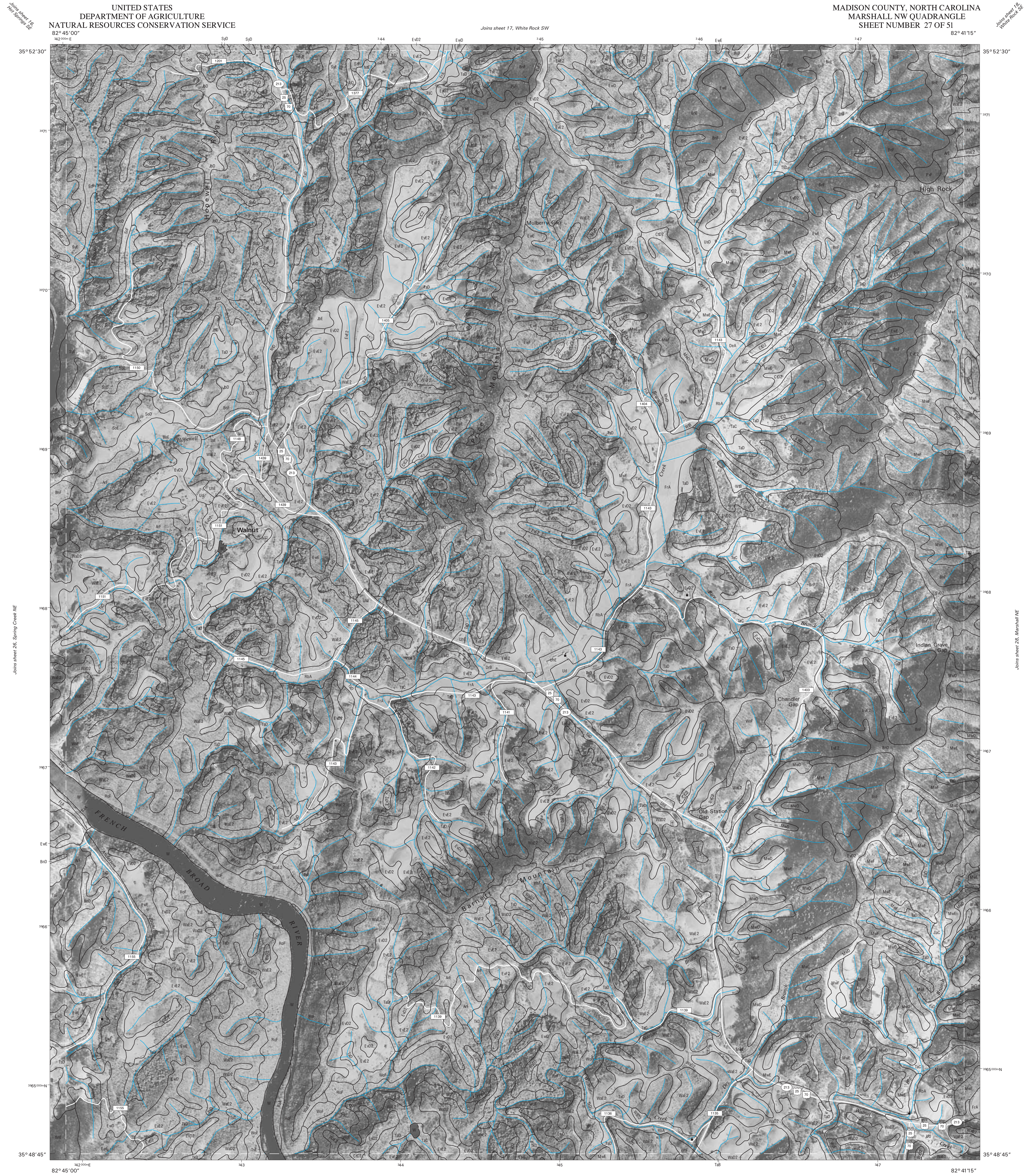
MADISON COUNTY, NORTH CAROLINA
MARSHALL NW QUADRANGLE
SHEET NUMBER 27 OF 51



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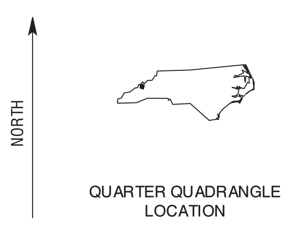

QUARTER QUADRANGLE LOCATION

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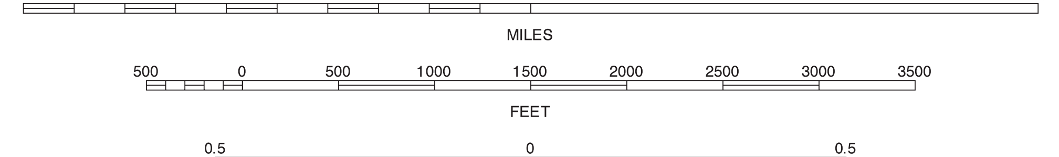

16	17	18
26		28
36	37	38

16 HOT SPRINGS SE
17 WHITE ROCK SW
18 WHITE ROCK SE
26 SPRING CREEK NE
28 MARSHALL NE
36 SPRING CREEK SE
37 MARSHALL SW
38 MARSHALL SE

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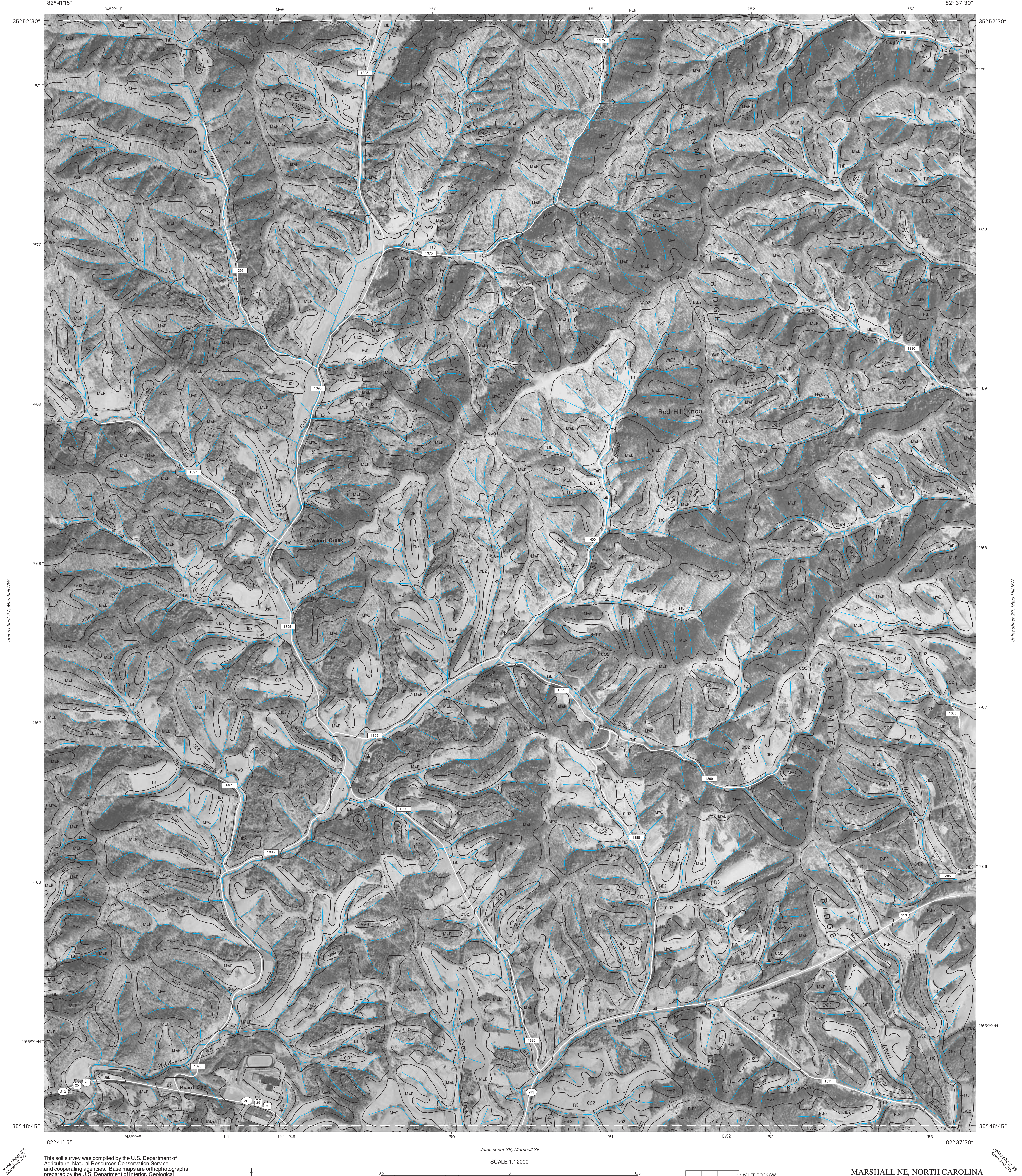
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MADISON COUNTY, NORTH CAROLINA
MARSHALL NE QUADRANGLE
SHEET NUMBER 28 OF 51


Joins sheet 17, White Rock SW
Joins sheet 18, White Rock SE
Joins sheet 19, Sams Gap SW
82° 41′15″
82° 37′30″
35° 52′30″
35° 48′45″
Joins sheet 27, Marshall NW
Joins sheet 29, Mars Hill NW
SEVENMILE RIDGE
Red Hill Knob
Walnut Creek
Byard Gap
Reese Gap
Joins sheet 37, Marshall SW
Joins sheet 38, Marshall SE
Joins sheet 39, Mars Hill SW

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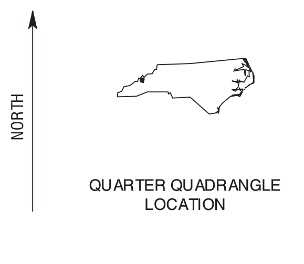
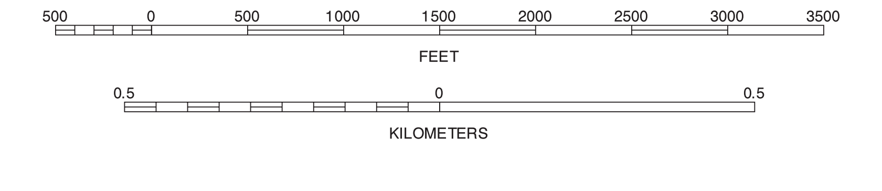


QUARTER QUADRANGLE LOCATION

SCALE 1:12000



17	18	19
27		29
37	38	39

17 WHITE ROCK SW
18 WHITE ROCK SE
19 SAMS GAP SW
27 MARSHALL NW
29 MARS HILL NW
37 MARSHALL SW
38 MARSHALL SE
39 MARS HILL SW

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MARSHALL NE, NORTH CAROLINA
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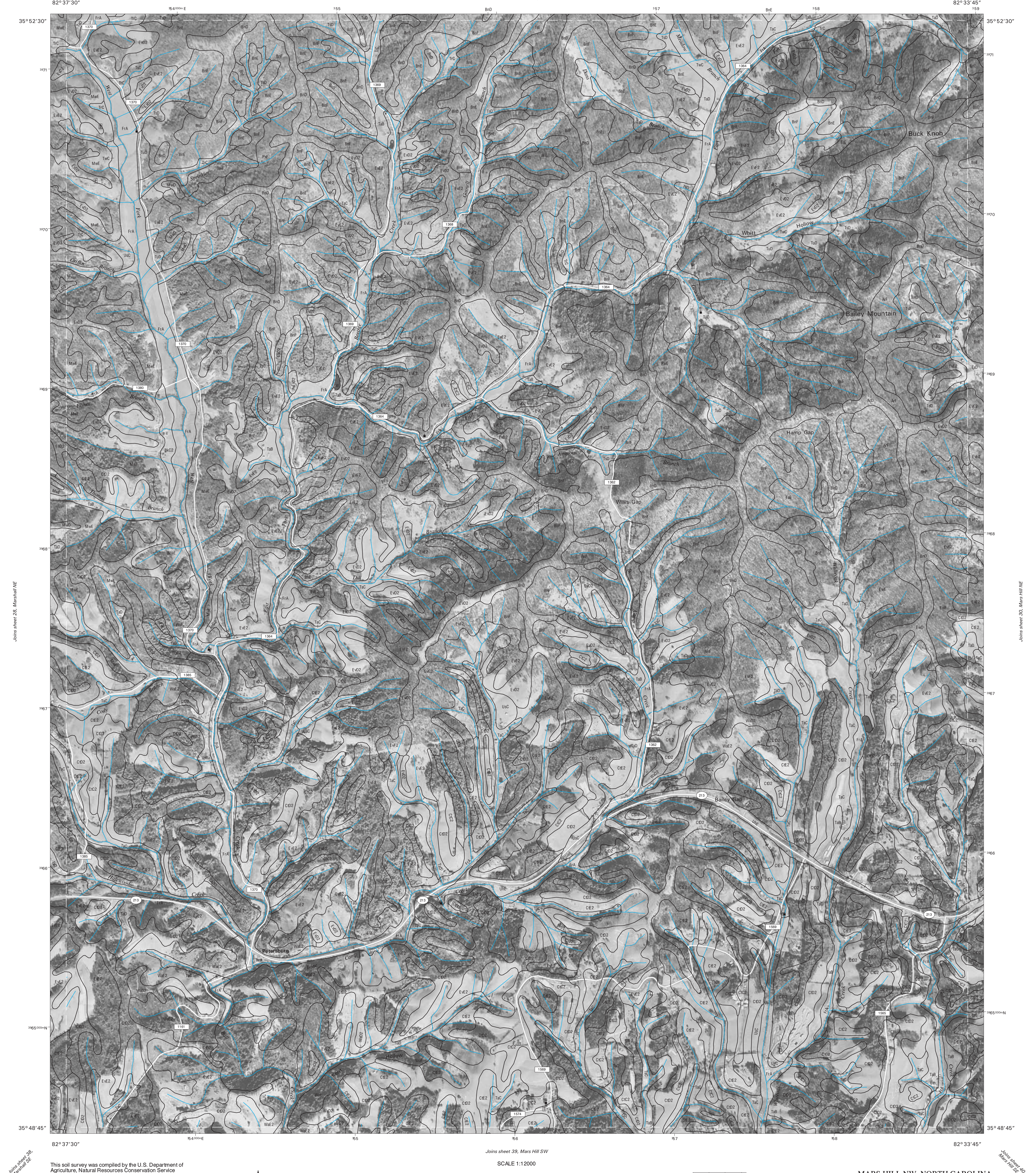
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MADISON COUNTY, NORTH CAROLINA
MARS HILL NW QUADRANGLE
SHEET NUMBER 29 OF 51

Joins sheet 18, White Rock SE

Joins sheet 20, Sams Gap SE



Joins sheet 38, Marshall SE

Joins sheet 40, Mars Hill SE

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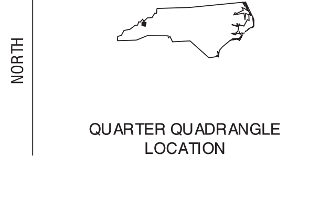
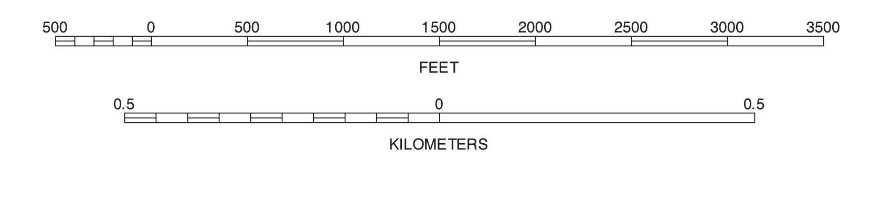
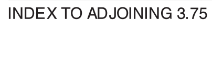
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000





18 WHITE ROCK SE
19 SAMS GAP SW
20 SAMS GAP SE
28 MARSHALL NE
30 MARS HILL NE
38 MARSHALL SE
39 MARS HILL SW
40 MARS HILL SE

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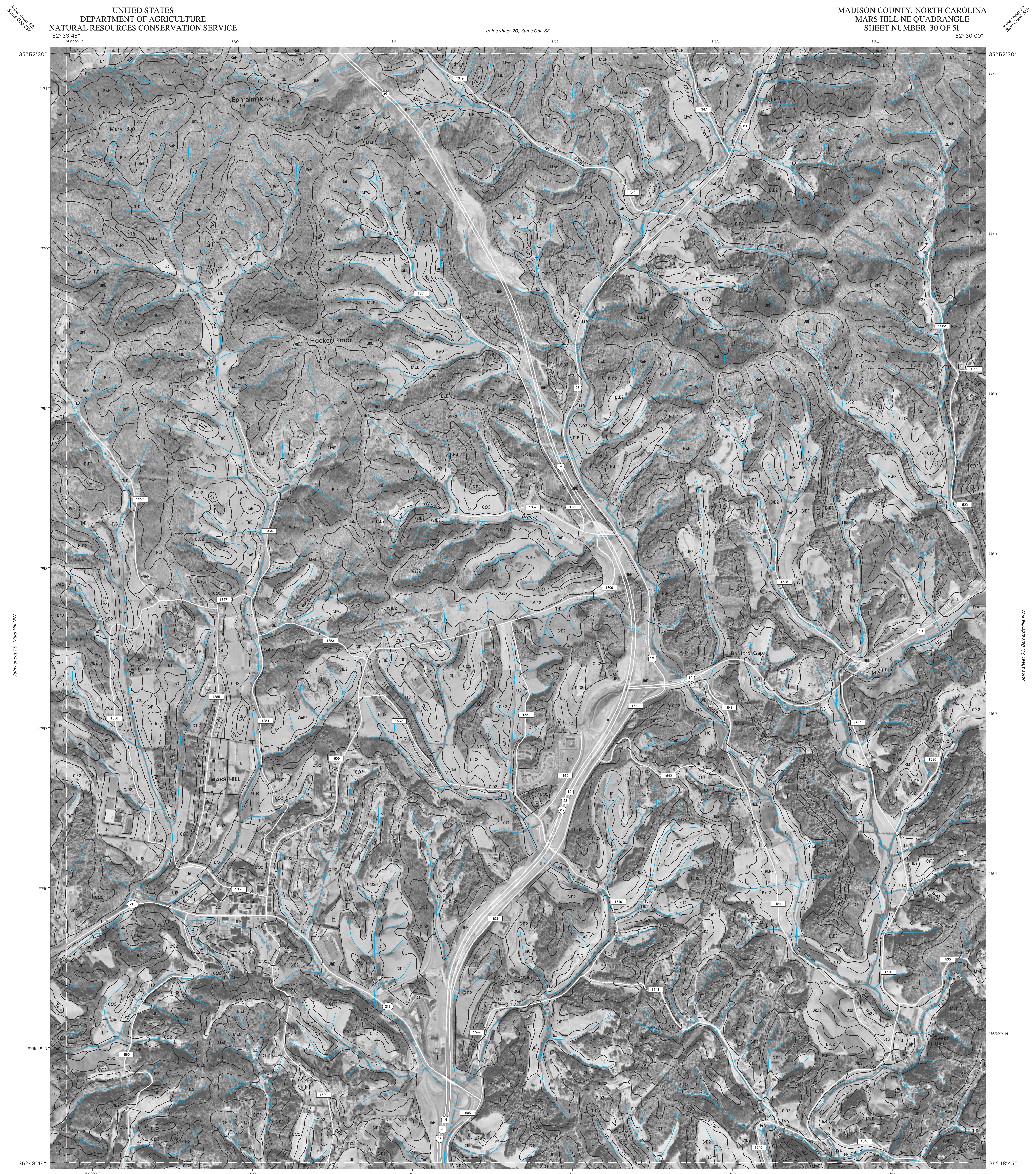
MADISON COUNTY, NORTH CAROLINA
MARS HILL NE QUADRANGLE
SHEET NUMBER 30 OF 51



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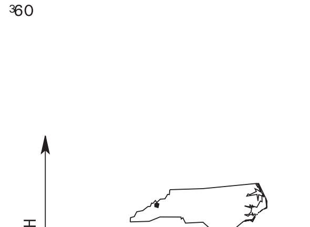
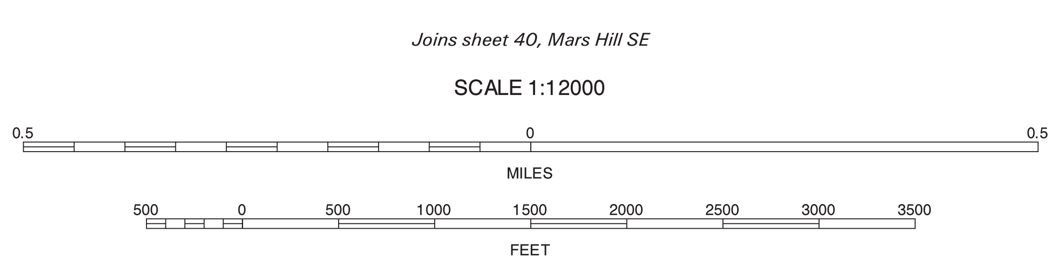
North American Datum of 1983 (NAD83). GRS-80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 17.
Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE
LOCATION

SCALE 1:12000



19 SAMS GAP SW
20 SAMS GAP SE
21 BALD CREEK SW
29 MARS HILL NW
31 BARNARDSVILLE NW
39 MARS HILL SW
40 MARS HILL SE
41 BARNARDSVILLE SW

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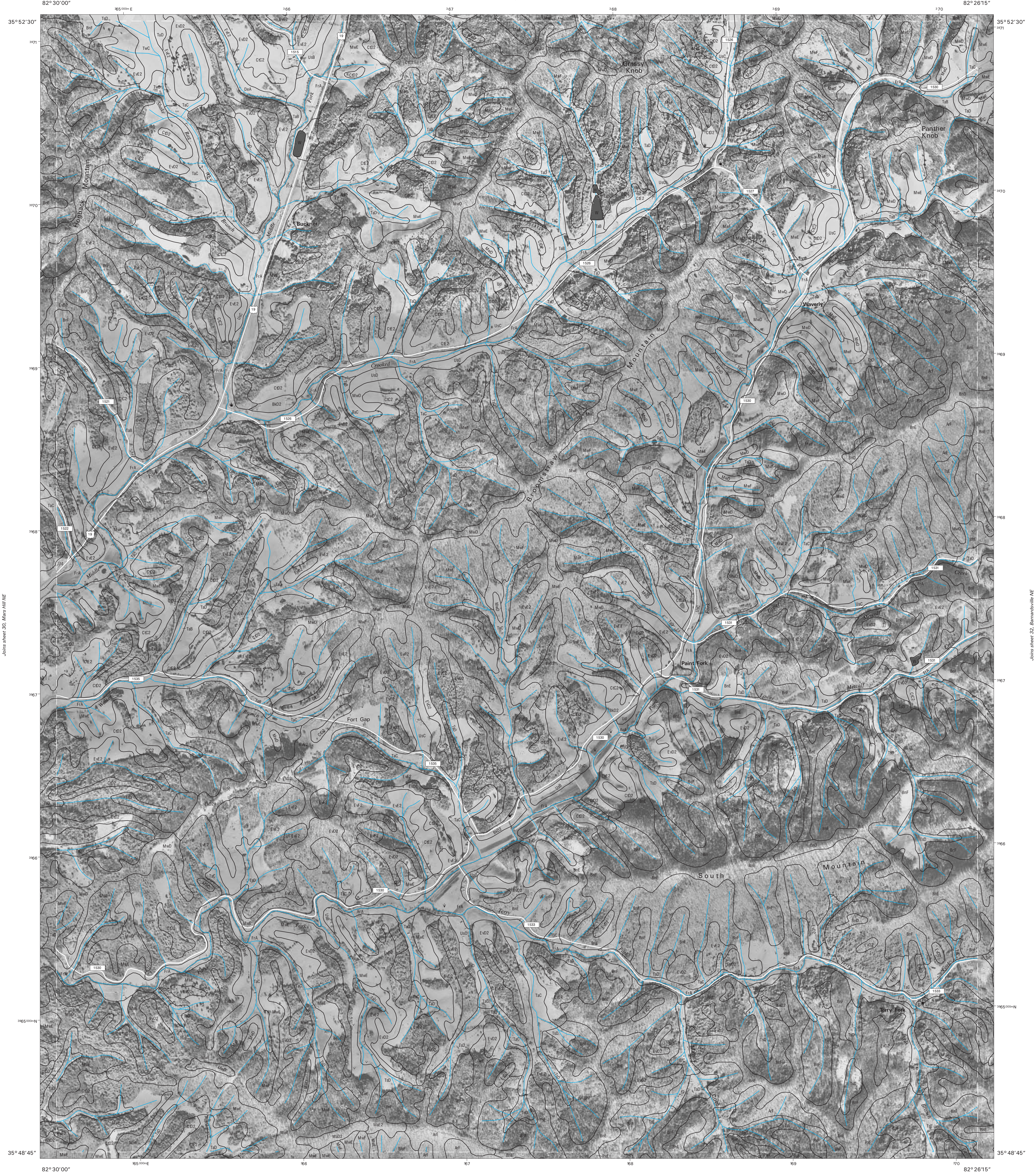
BARNARDSVILLE NW QUADRANGLE
SHEET NUMBER 31 OF 51

Joins sheet 20, Sams Gap SE

Joins sheet 21, Bald Creek SW

Joins sheet 22, Bald Creek SE



Joins sheet 41, Barnardsville SW

Joins sheet 40, Mars Hill SE

Joins sheet 42, Barnardsville SE

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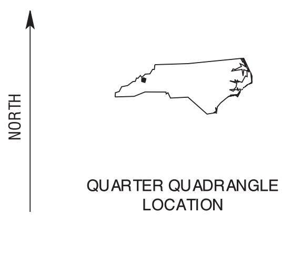
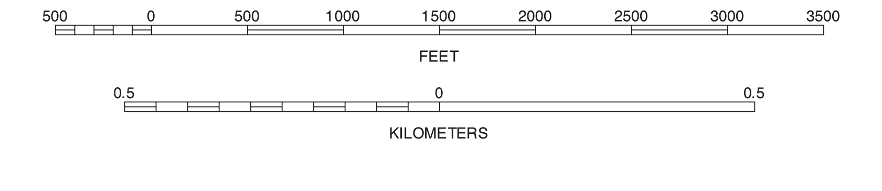
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000



20	21	22
30		32
40	41	42

20 SAMS GAP SE
21 BALD CREEK SW
22 BALD CREEK SE
30 MARS HILL NE
32 BARNARDSVILLE NE
40 MARS HILL SE
41 BARNARDSVILLE SW
42 BARNARDSVILLE SE

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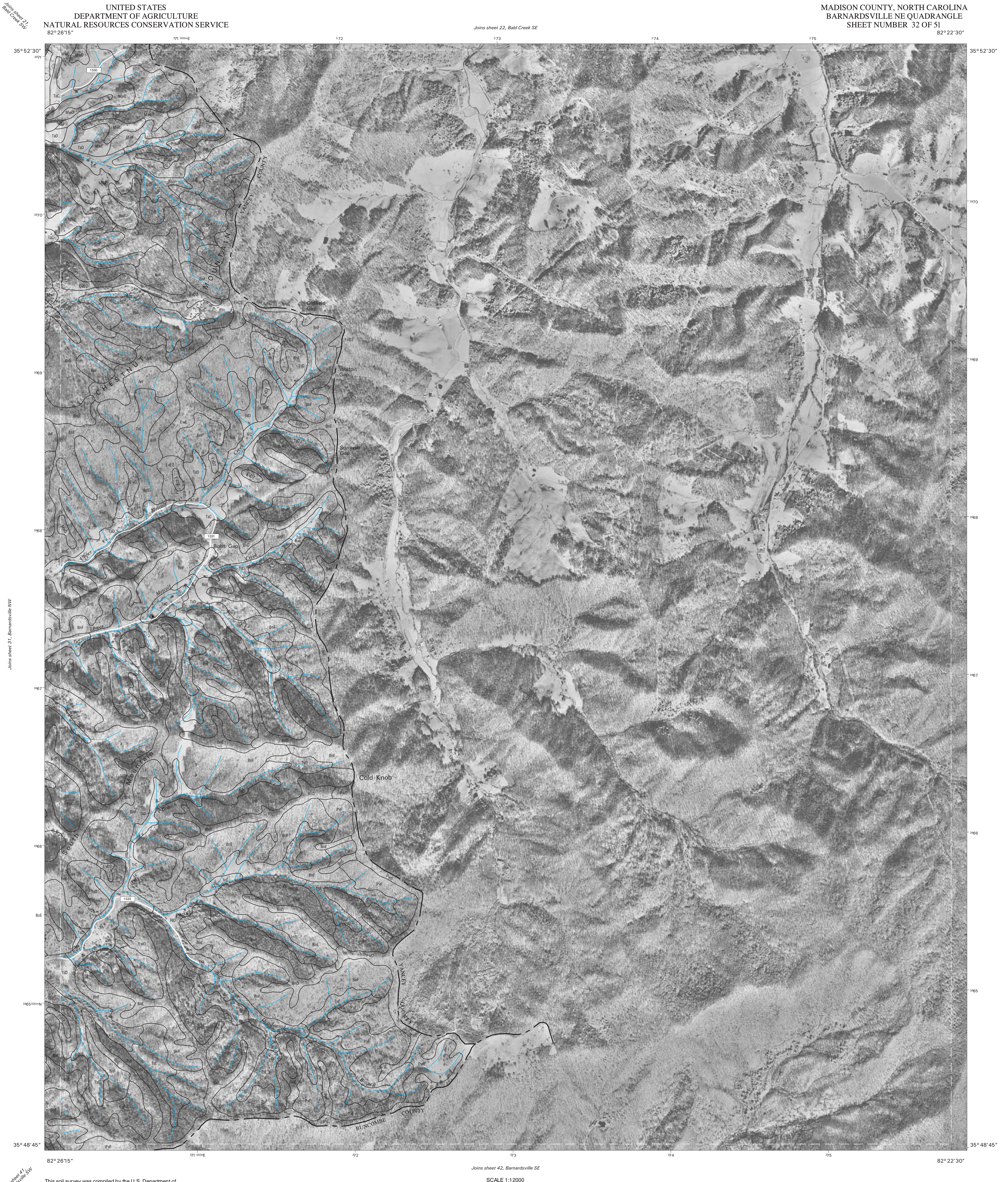
BARNARDSVILLE NE QUADRANGLE
SHEET NUMBER 32 OF 51



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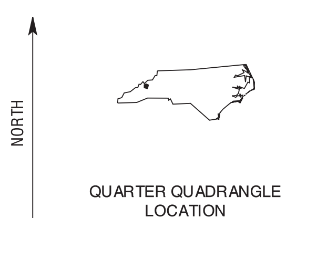
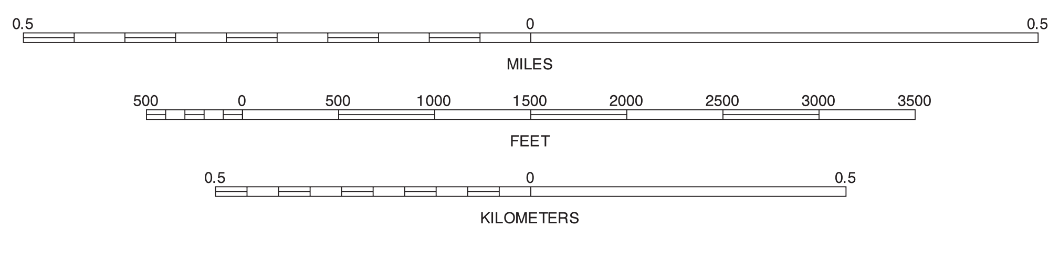
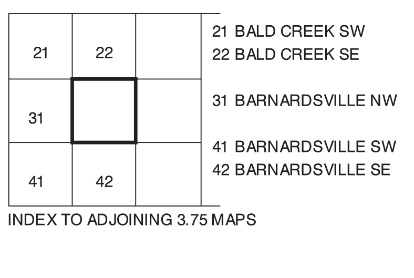
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE
LOCATION

SCALE 1:12000





21 BALD CREEK SW
22 BALD CREEK SE
31 BARNARDSVILLE NW
41 BARNARDSVILLE SW
42 BARNARDSVILLE SE

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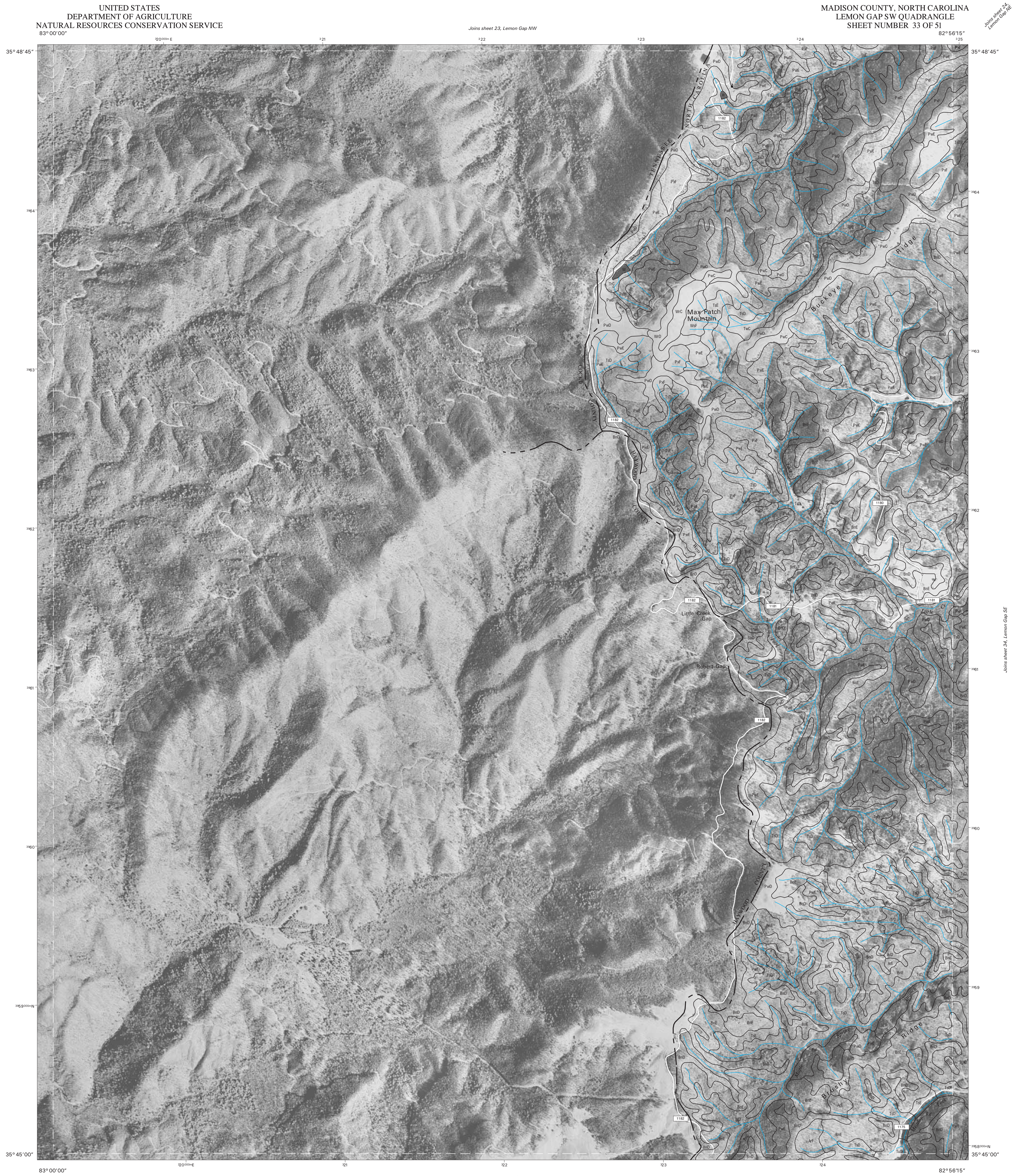
MADISON COUNTY, NORTH CAROLINA
LEMON GAP SW QUADRANGLE
SHEET NUMBER 33 OF 51



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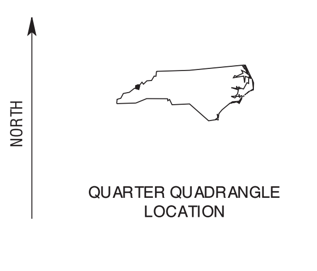
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE LOCATION

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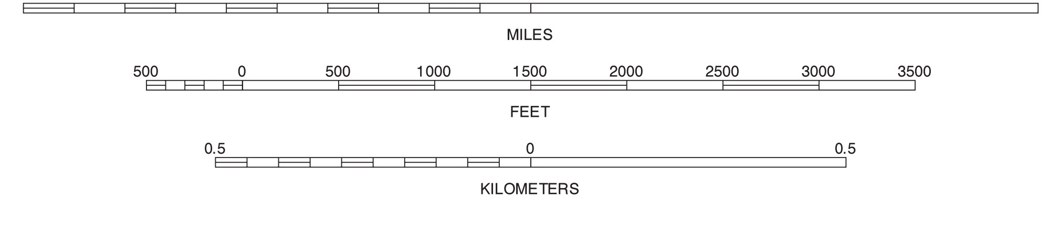

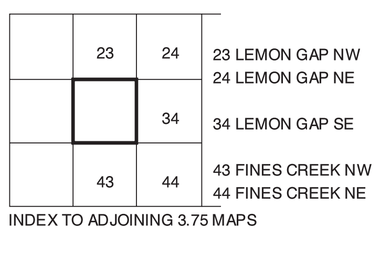

23 LEMON GAP NW
24 LEMON GAP NE
34 LEMON GAP SE
43 FINES CREEK NW
44 FINES CREEK NE

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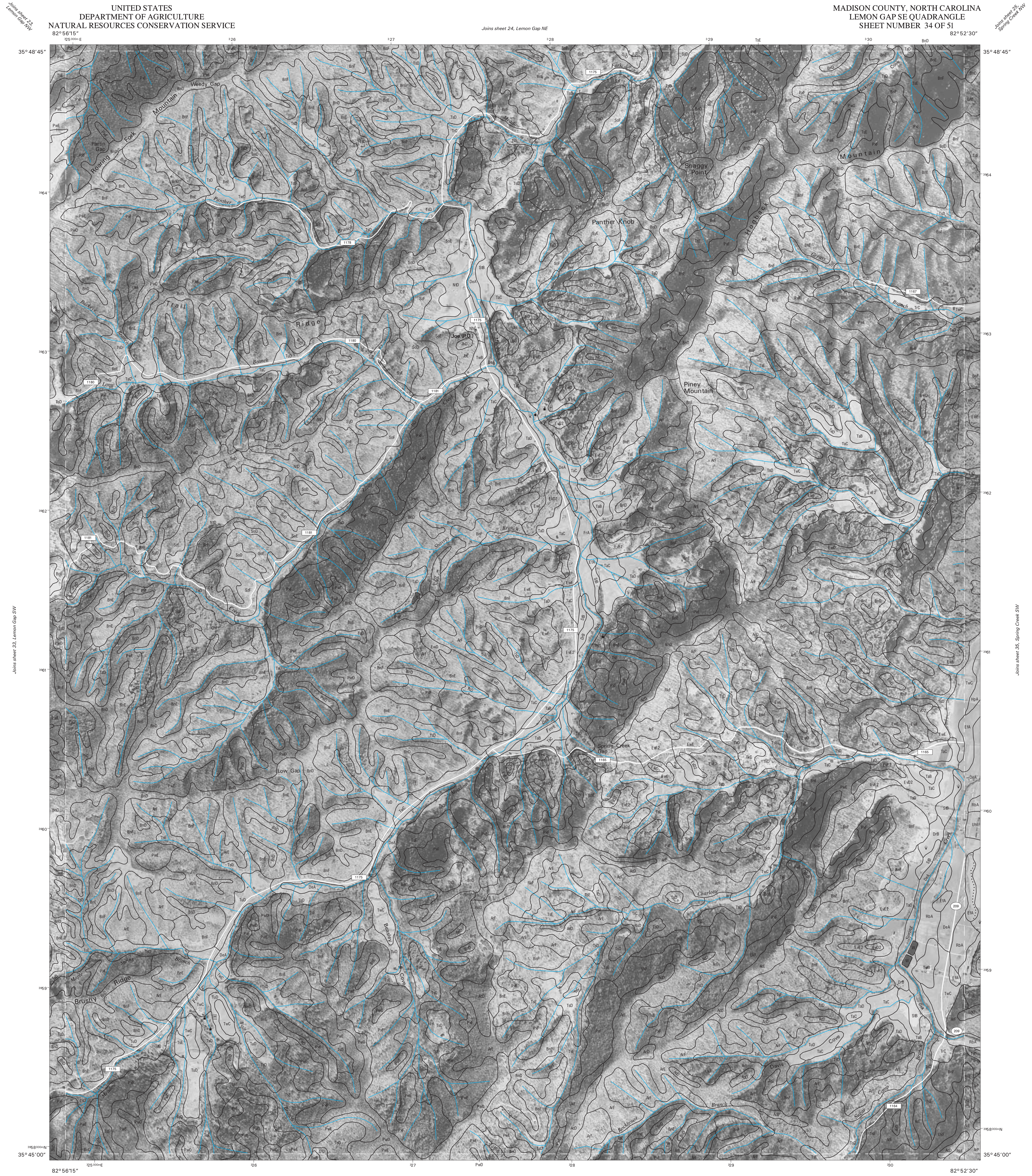
LEMON GAP SE QUADRANGLE
SHEET NUMBER 34 OF 51



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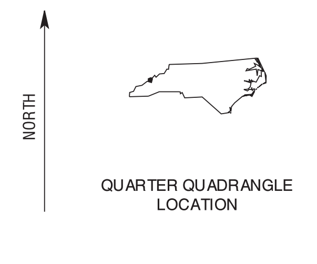
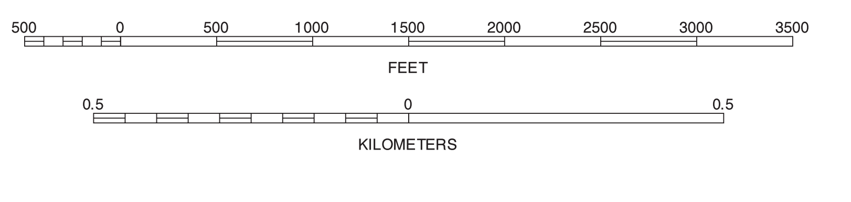


QUARTER QUADRANGLE LOCATION

SCALE 1:12000



23	24	25
33		35
43	44	45

23 LEMON GAP NW
24 LEMON GAP NE
25 SPRING CREEK NW
33 LEMON GAP SW
35 SPRING CREEK SW
43 FINES CREEK NW
44 FINES CREEK NE
45 SANDYMUSH NW

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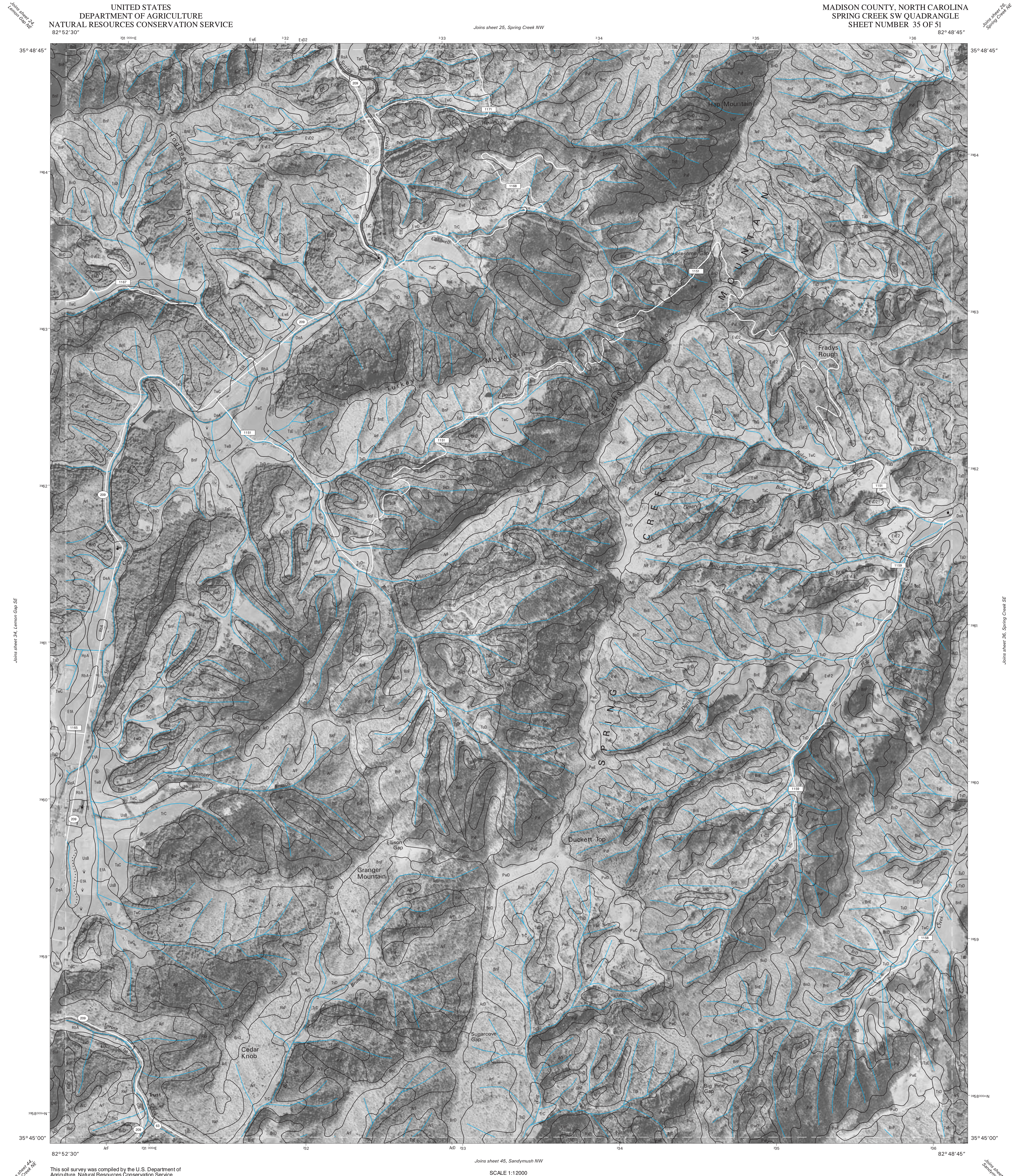
SPRING CREEK SW QUADRANGLE
SHEET NUMBER 35 OF 51


Joins sheet 24, Lemon Gap NE
Joins sheet 25, Spring Creek NW
Joins sheet 26, Spring Creek NE
Joins sheet 34, Lemon Gap SE
Joins sheet 36, Spring Creek SE
Joins sheet 44, Fines Creek NE
Joins sheet 45, Sandymush NW
Joins sheet 46, Sandymush NE
82° 52′30″
82° 48′45″
35° 48′45″
35° 45′00″
Hap Mountain
Troublesome Gap
Fradys Rough
Duckett Top
Ellison Gap
Granger Mountain
Sugarcove Gap
Cedar Knob
Big Pine Gap
Trust
SPRING CREEK MOUNTAIN
Hogback Mountain
Turkey Mountain

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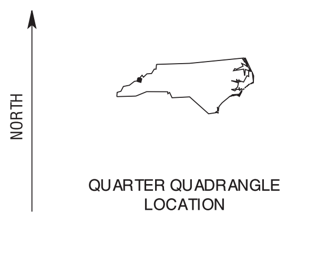
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE
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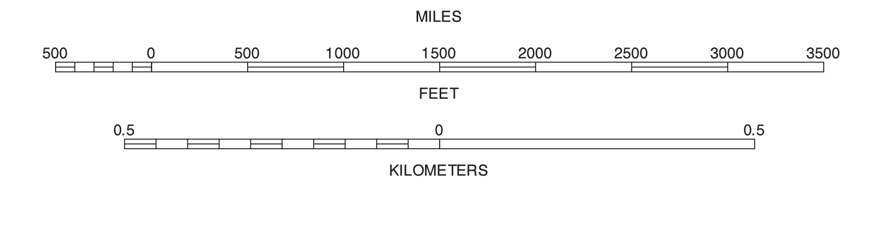
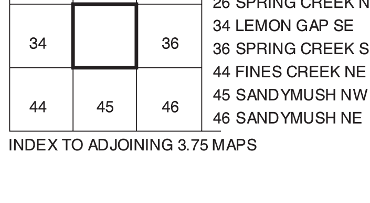
SCALE 1:12000





24 LEMON GAP NE
25 SPRING CREEK NW
26 SPRING CREEK NE
34 LEMON GAP SE
36 SPRING CREEK SE
44 FINES CREEK NE
45 SANDYMUSH NW
46 SANDYMUSH NE

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SPRING CREEK SE QUADRANGLE
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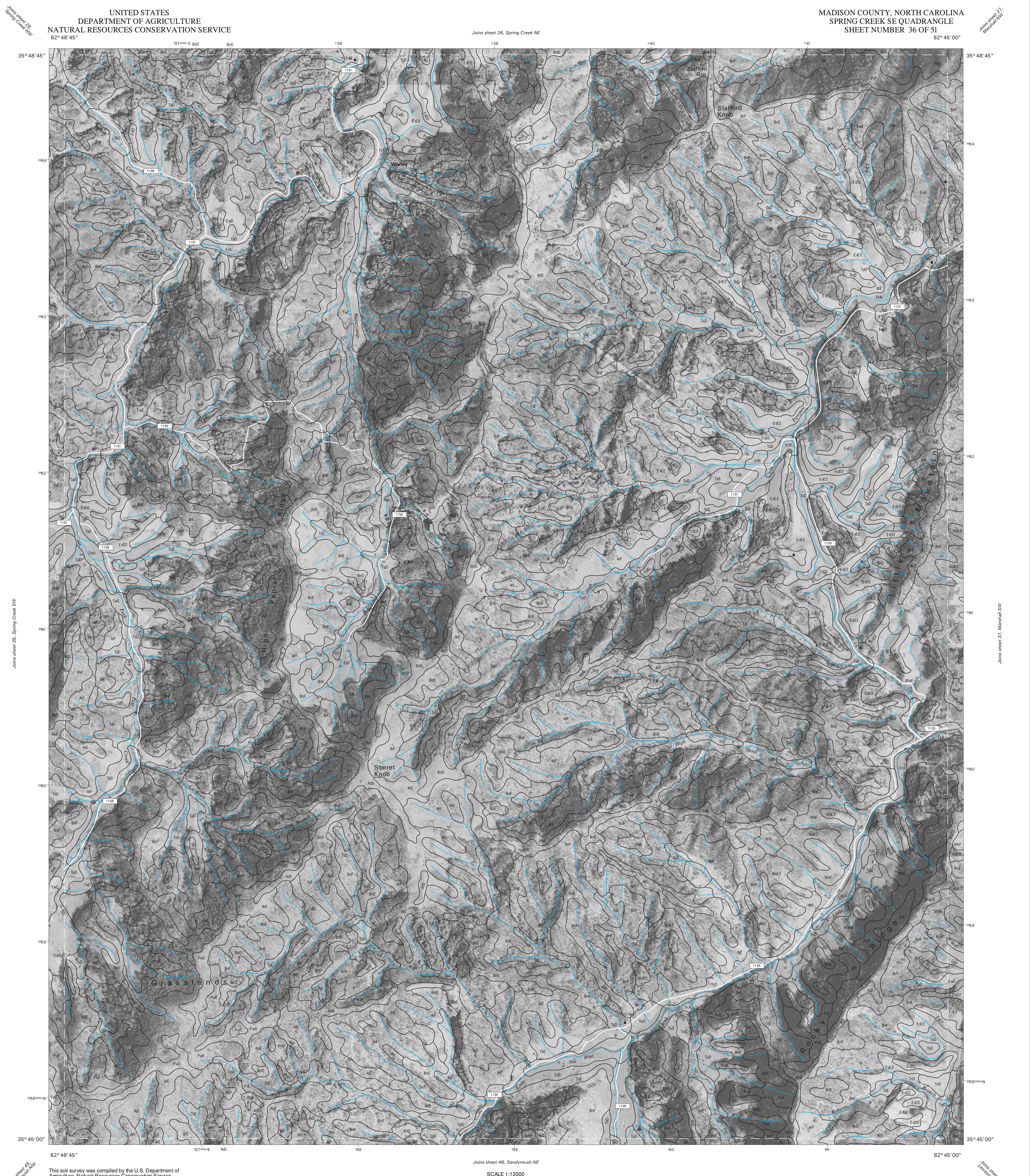

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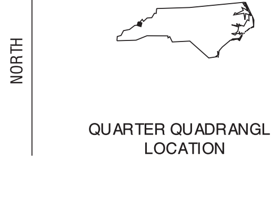
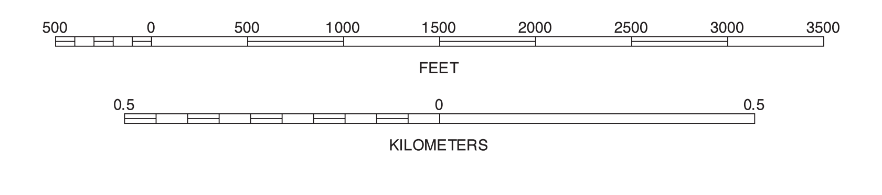


QUARTER QUADRANGLE
LOCATION

SCALE 1:12000



25	26	27
35		37
45	46	47

25 SPRING CREEK NW
26 SPRING CREEK NE
27 MARSHALL NW
35 SPRING CREEK SW
37 MARSHALL SW
45 SANDYMUSH NW
46 SANDYMUSH NE
47 LEICESTER NW

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Joins sheet 45, Sandymush NW

Joins sheet 47, Leicester NW

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MARSHALL SW QUADRANGLE
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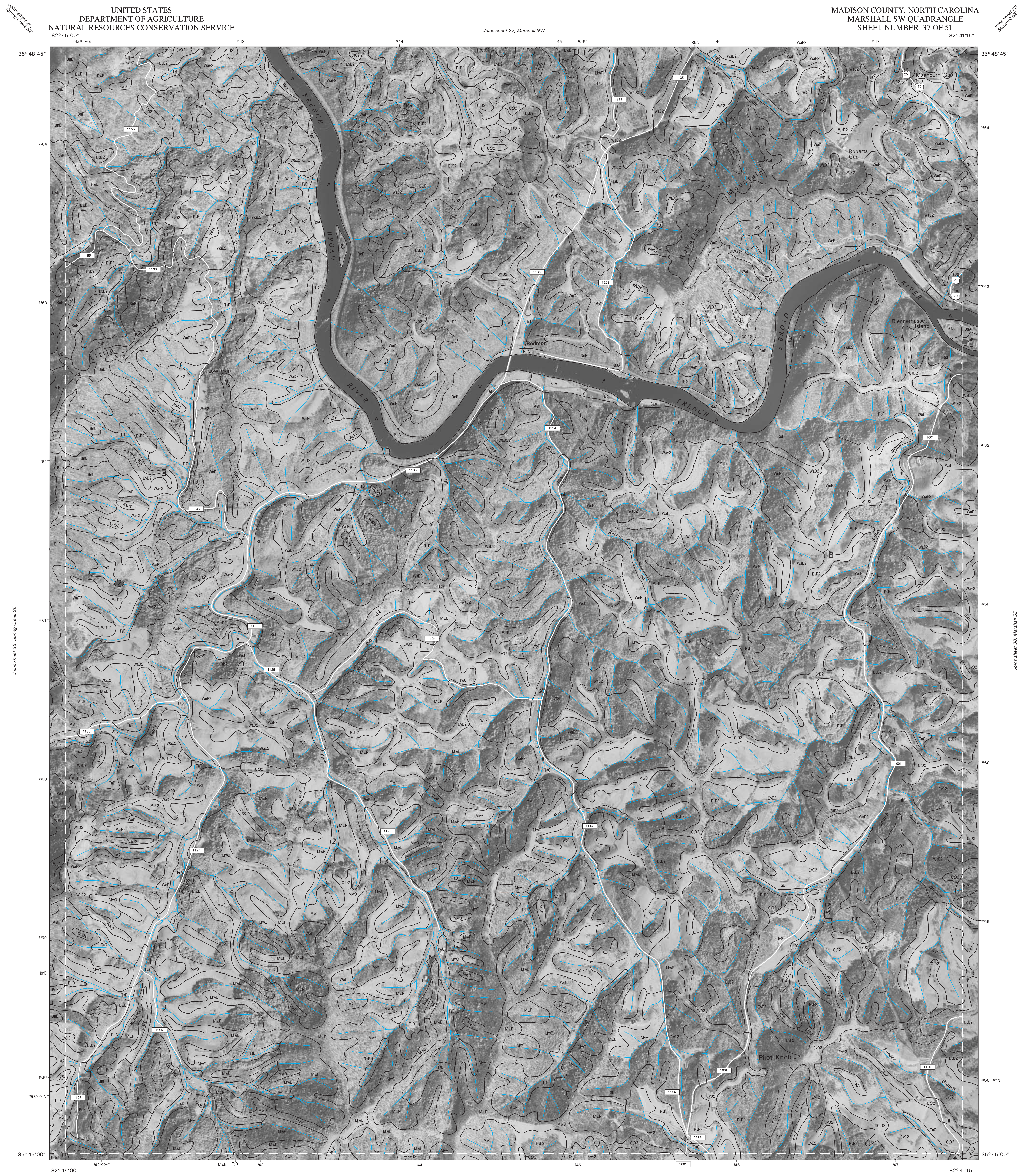
Joins sheet 26, Spring Creek NE
Joins sheet 27, Marshall NW
Joins sheet 28, Marshall NE
Joins sheet 36, Spring Creek SE
Joins sheet 38, Marshall SE
Joins sheet 46, Sandymush NE
Joins sheet 47, Leicester NW
Joins sheet 48, Leicester NE
82° 45′00″
82° 41′15″
35° 48′45″
35° 45′00″
FRENCH BROAD RIVER
Redmon
Low Gap
Little Mountain
Roberts Mountain
Roberts Gap
Mashburn Gap
Blennerhassett Island
Pilot Knob
1001
1114
1124
1125
1126
1127
1133
1135
1136
1155
1203
25
70

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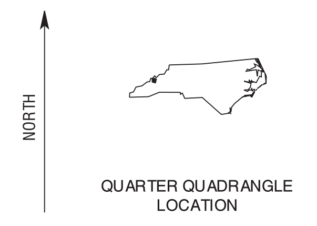

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES: 0.5 — 0 — 0.5

FEET: 500 — 0 — 500 — 1000 — 1500 — 2000 — 2500 — 3000 — 3500

KILOMETERS: 0.5 — 0 — 0.5

26	27	28
36		38
46	47	48

26 SPRING CREEK NE
27 MARSHALL NW
28 MARSHALL NE
36 SPRING CREEK SE
38 MARSHALL SE
46 SANDYMUSH NE
47 LEICESTER NW
48 LEICESTER NE

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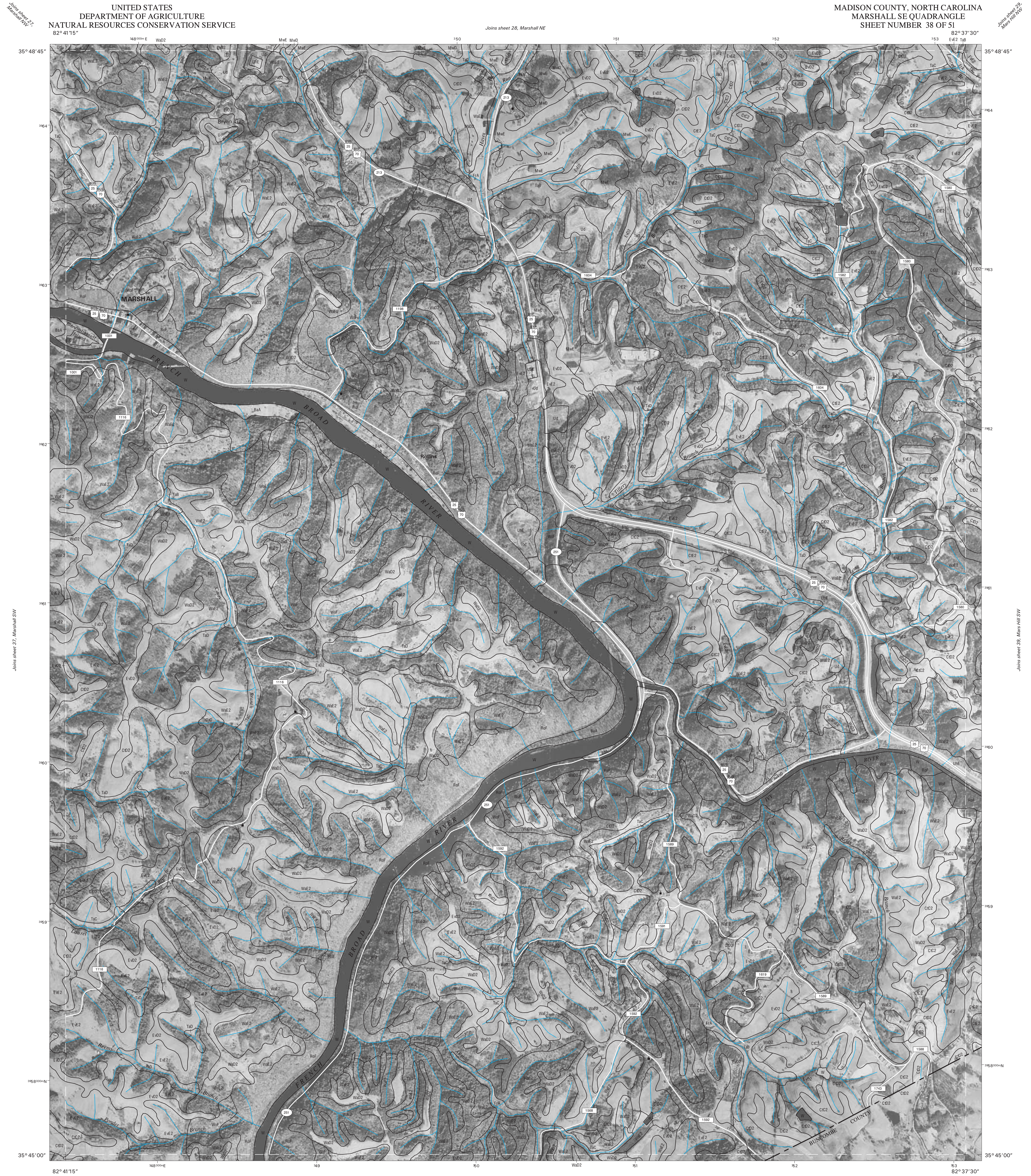

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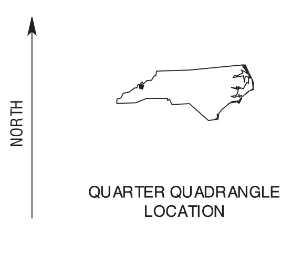
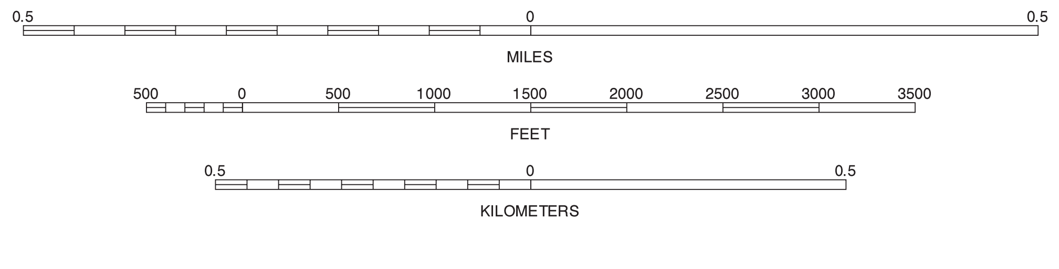


QUARTER QUADRANGLE LOCATION

SCALE 1:12000



27	28	29
37		39
47	48	

27 MARSHALL NW
28 MARSHALL NE
29 MARS HILL NW
37 MARSHALL SW
39 MARS HILL SW
47 LEICESTER NW
48 LEICESTER NE

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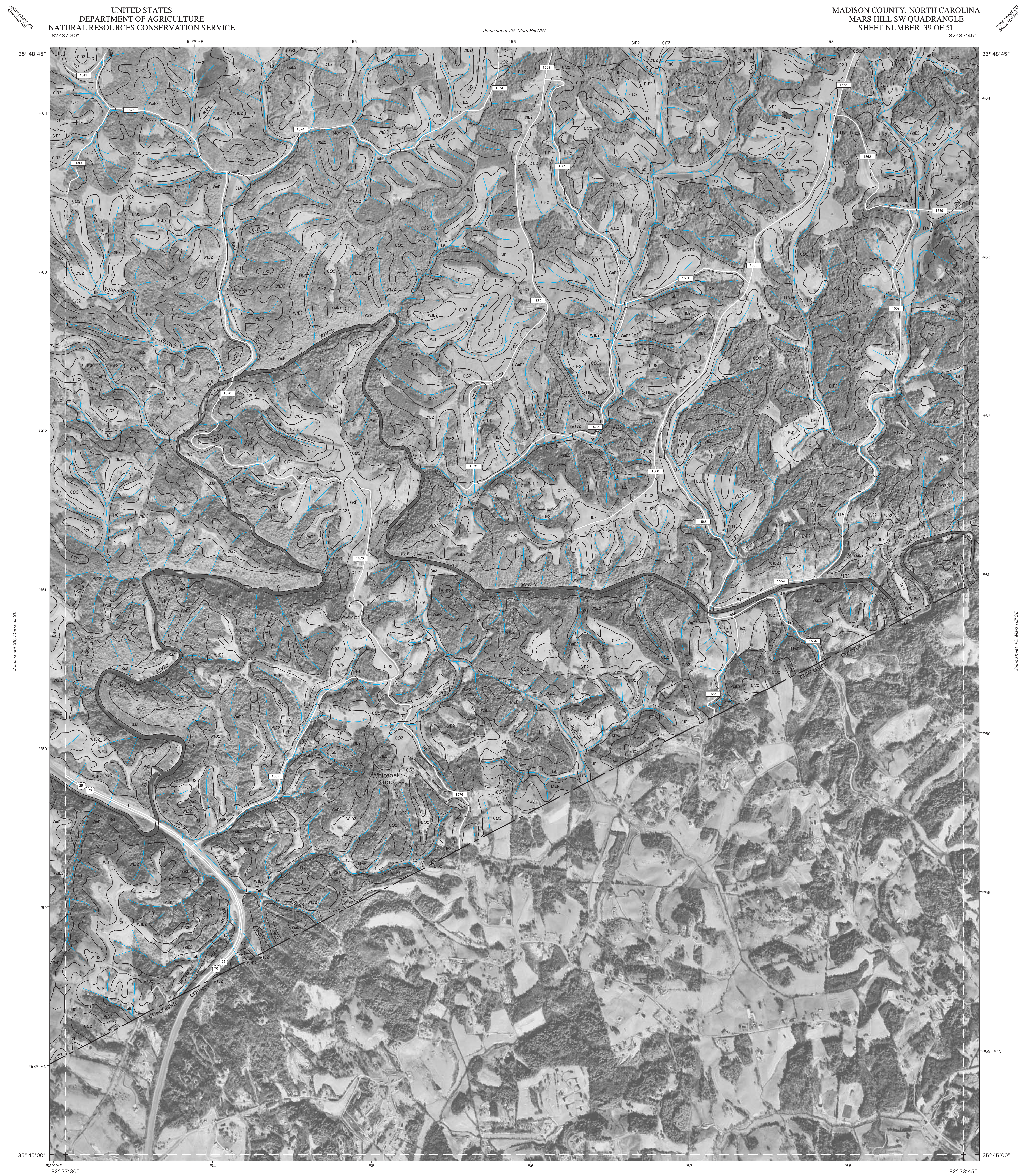
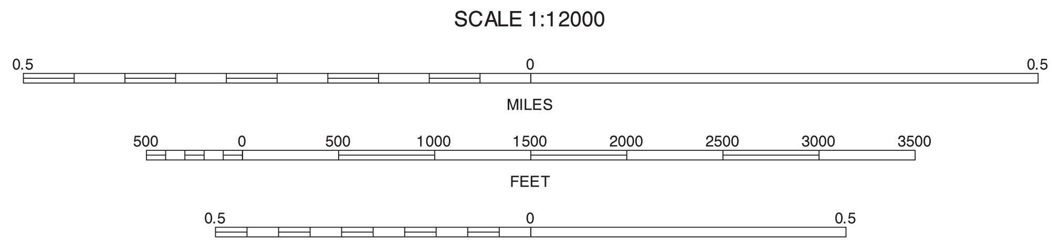
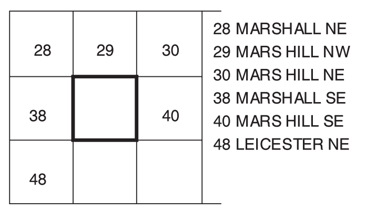
MARS HILL SW QUADRANGLE
SHEET NUMBER 39 OF 51



This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1998-1999 aerial photography. Hydrography and cultural features were acquired from NRCS and edited to conform with the features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.





MARS HILL SW, NORTH CAROLINA

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SHEET NUMBER 39 OF 51

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

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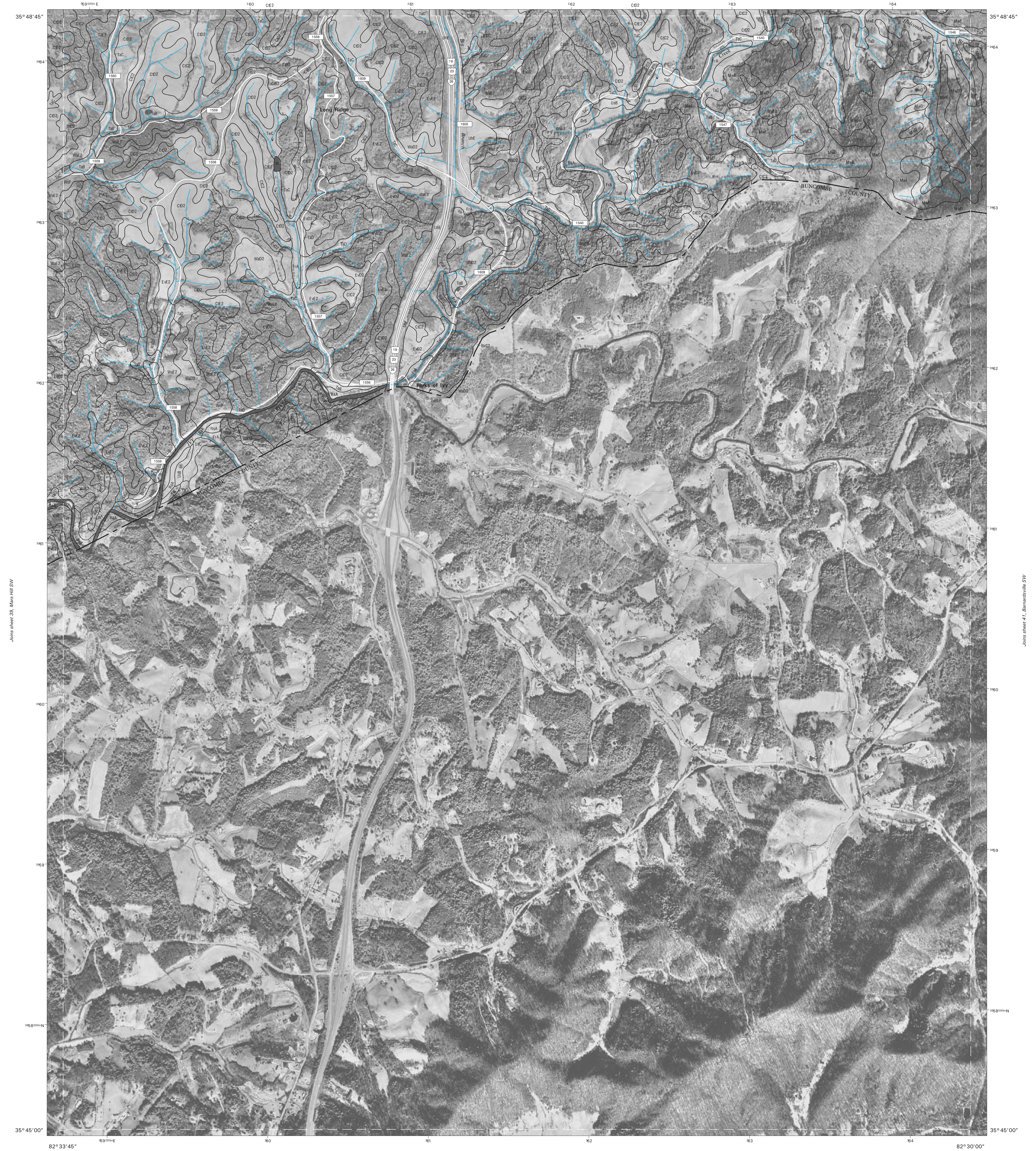
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MADISON COUNTY, NORTH CAROLINA
MARS HILL SE QUADRANGLE
SHEET NUMBER 40 OF 51



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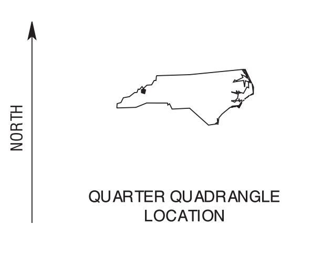

QUARTER QUADRANGLE
LOCATION

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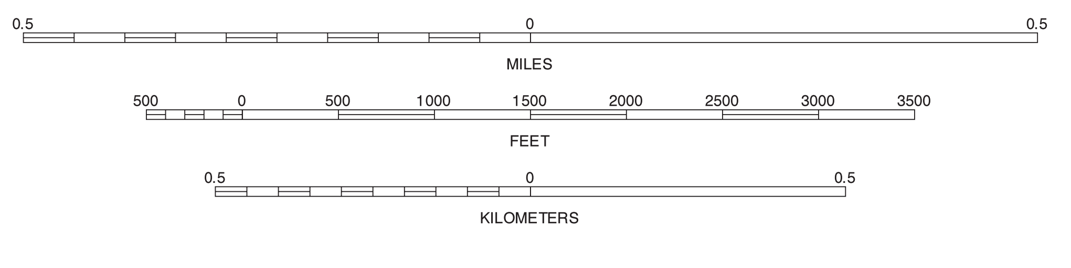

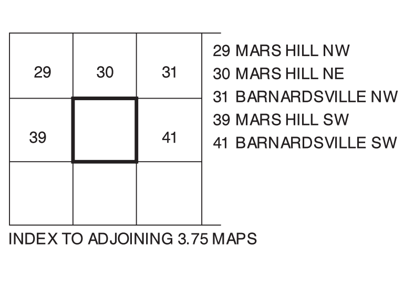

29 MARS HILL NW
30 MARS HILL NE
31 BARNARDSVILLE NW
39 MARS HILL SW
41 BARNARDSVILLE SW

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MARS HILL SE, NORTH CAROLINA

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Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

Joins sheet 30, Mars Hill NE

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MADISON COUNTY, NORTH CAROLINA
BARNARDSVILLE SW QUADRANGLE
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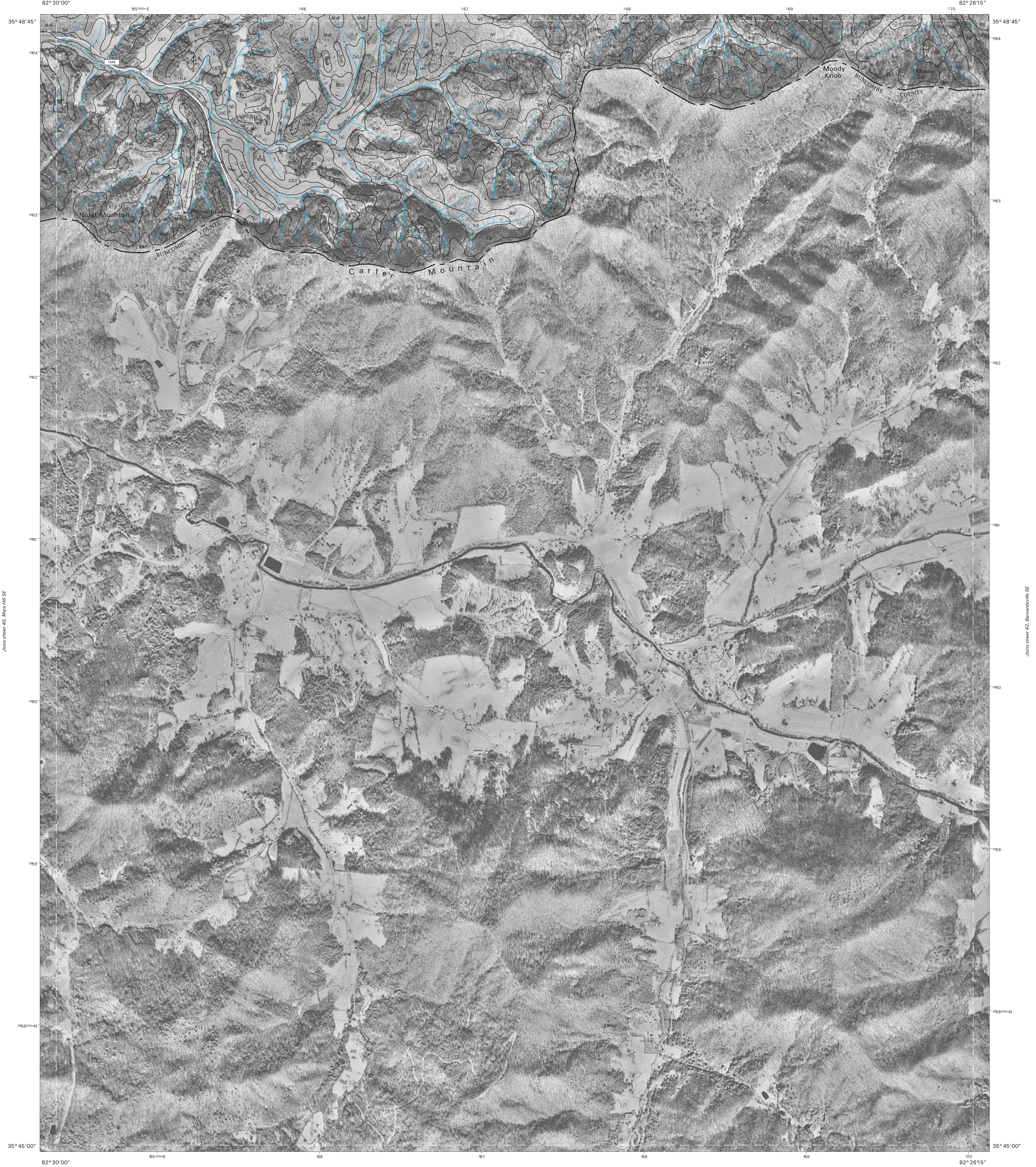
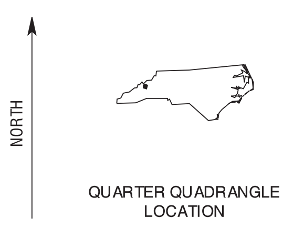
Joins sheet 32, Barnardsville NE



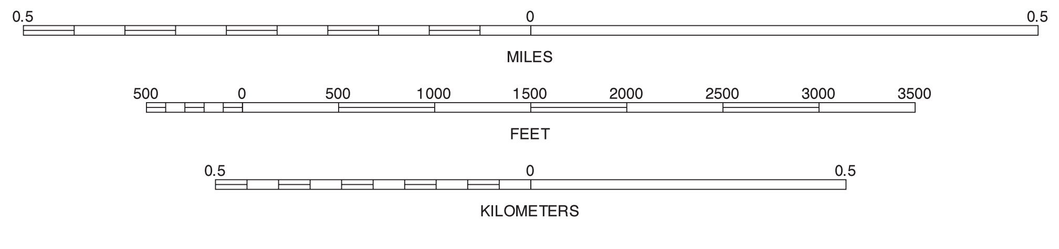
This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1998-1999 aerial photography. Hydrography and cultural features were acquired from NRCS and edited to conform with the features represented on the publication orthophotography and to enhance the clarity of the soils information.

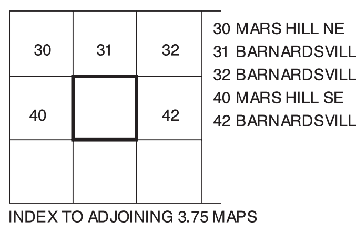
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000





30 MARS HILL NE
31 BARNARDSVILLE NW
32 BARNARDSVILLE NE
40 MARS HILL SE
42 BARNARDSVILLE SE

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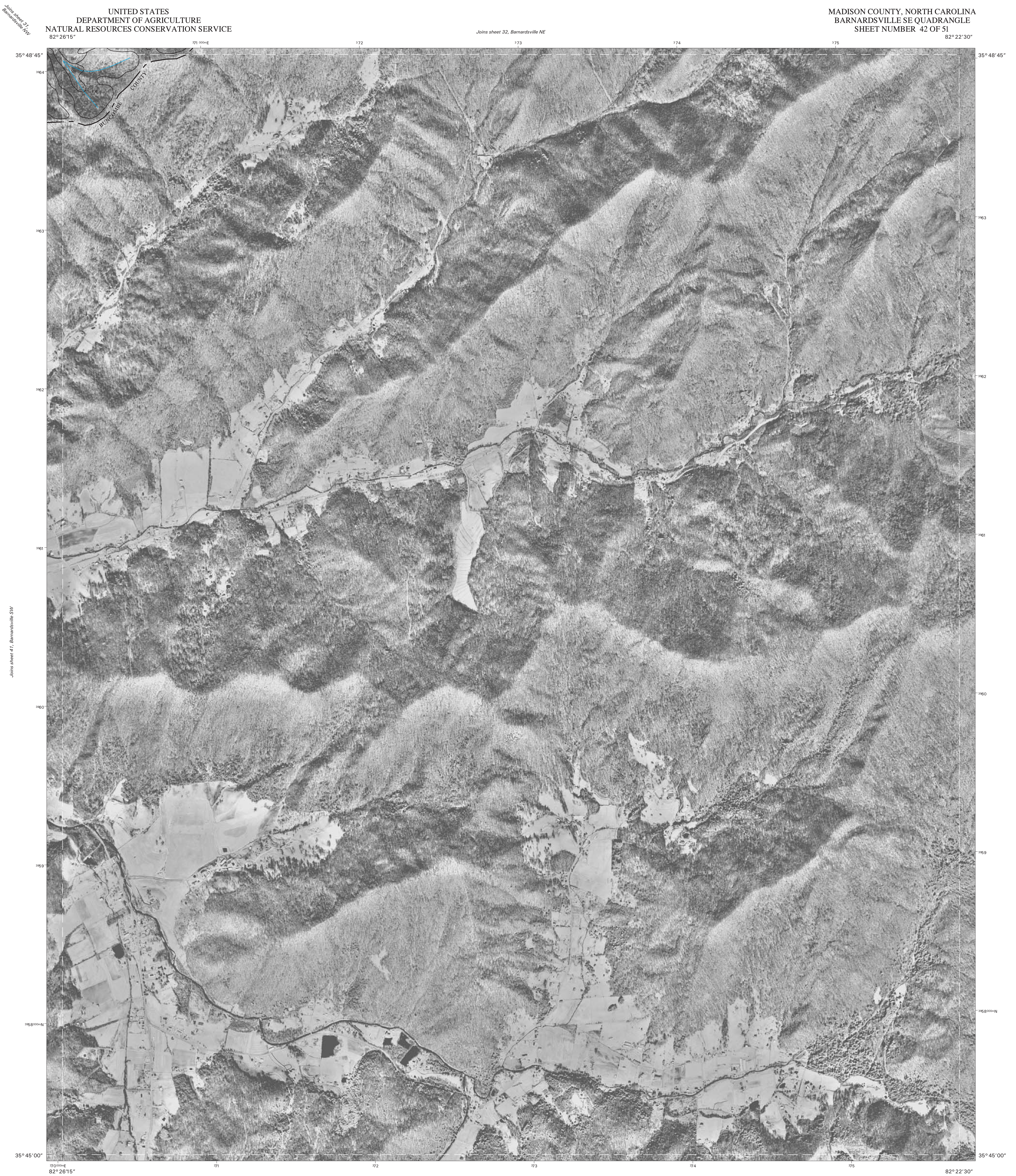
MADISON COUNTY, NORTH CAROLINA
BARNARDSVILLE SE QUADRANGLE
SHEET NUMBER 42 OF 51



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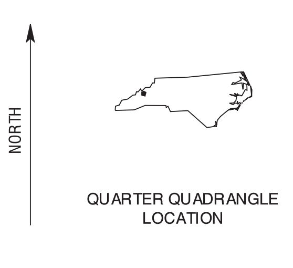
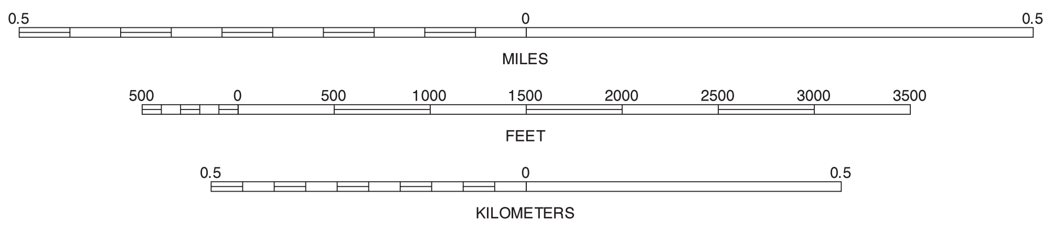
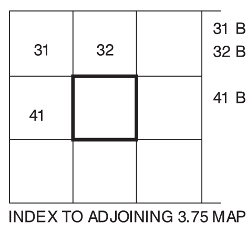
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE
LOCATION

SCALE 1:12000





31 BARNARDSVILLE NW
32 BARNARDSVILLE NE
41 BARNARDSVILLE SW

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MADISON COUNTY, NORTH CAROLINA
FINES CREEK NW QUADRANGLE
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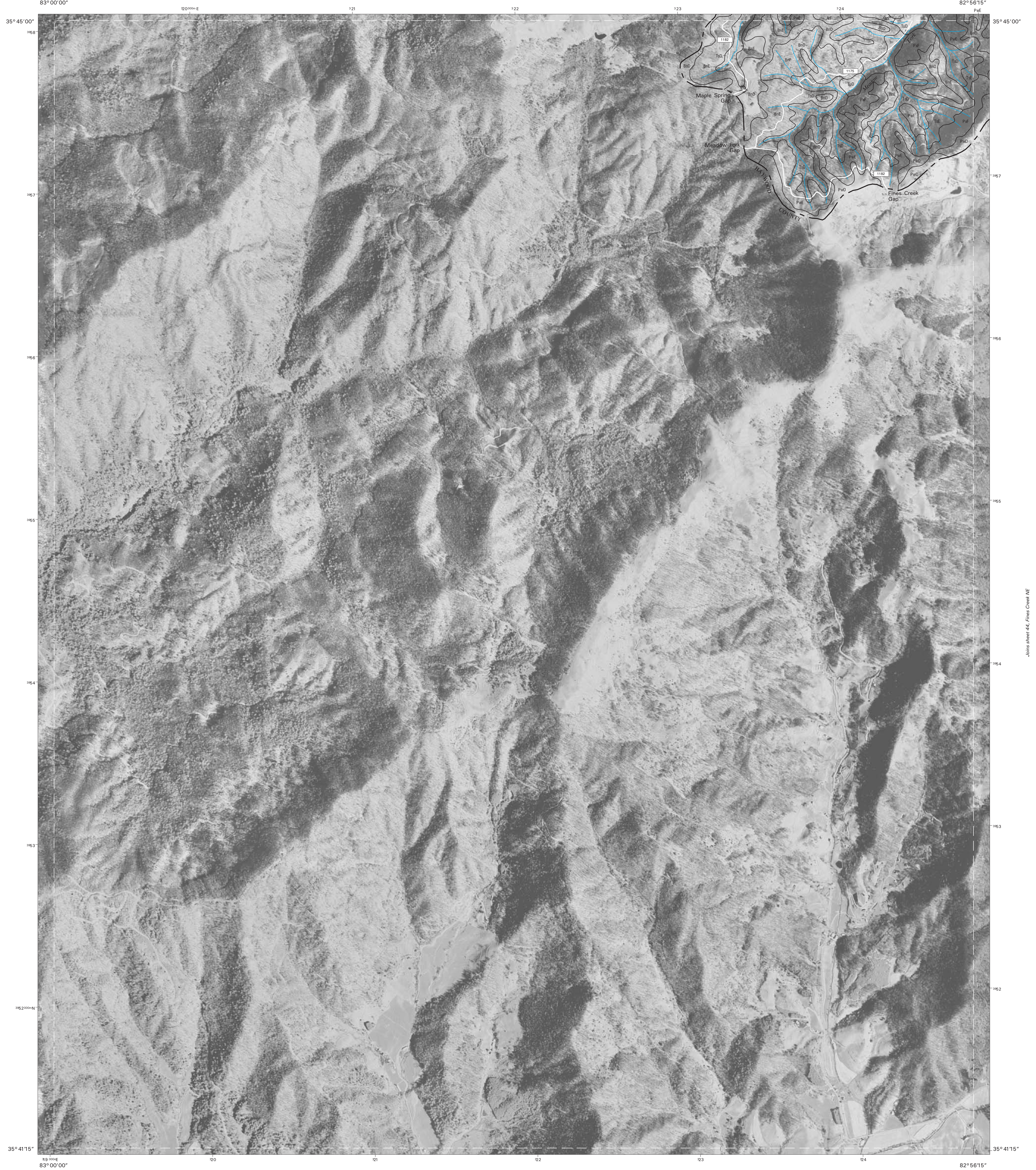
Joins sheet 34, Lemon Gap SE



Joins sheet 49, Fines Creek SE

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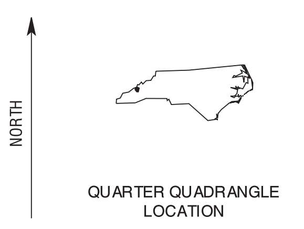
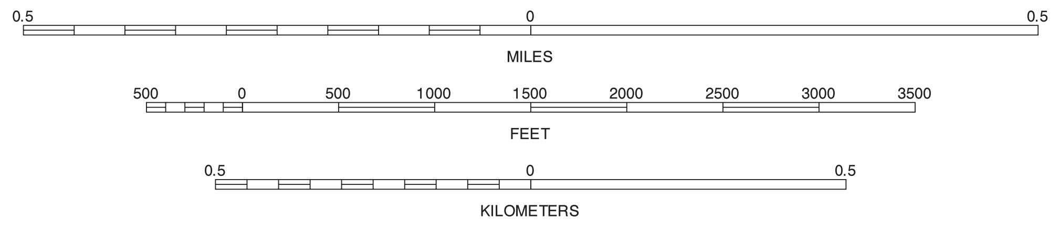
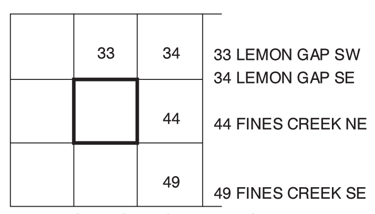


QUARTER QUADRANGLE LOCATION

SCALE 1:12000





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DEPARTMENT OF AGRICULTURE
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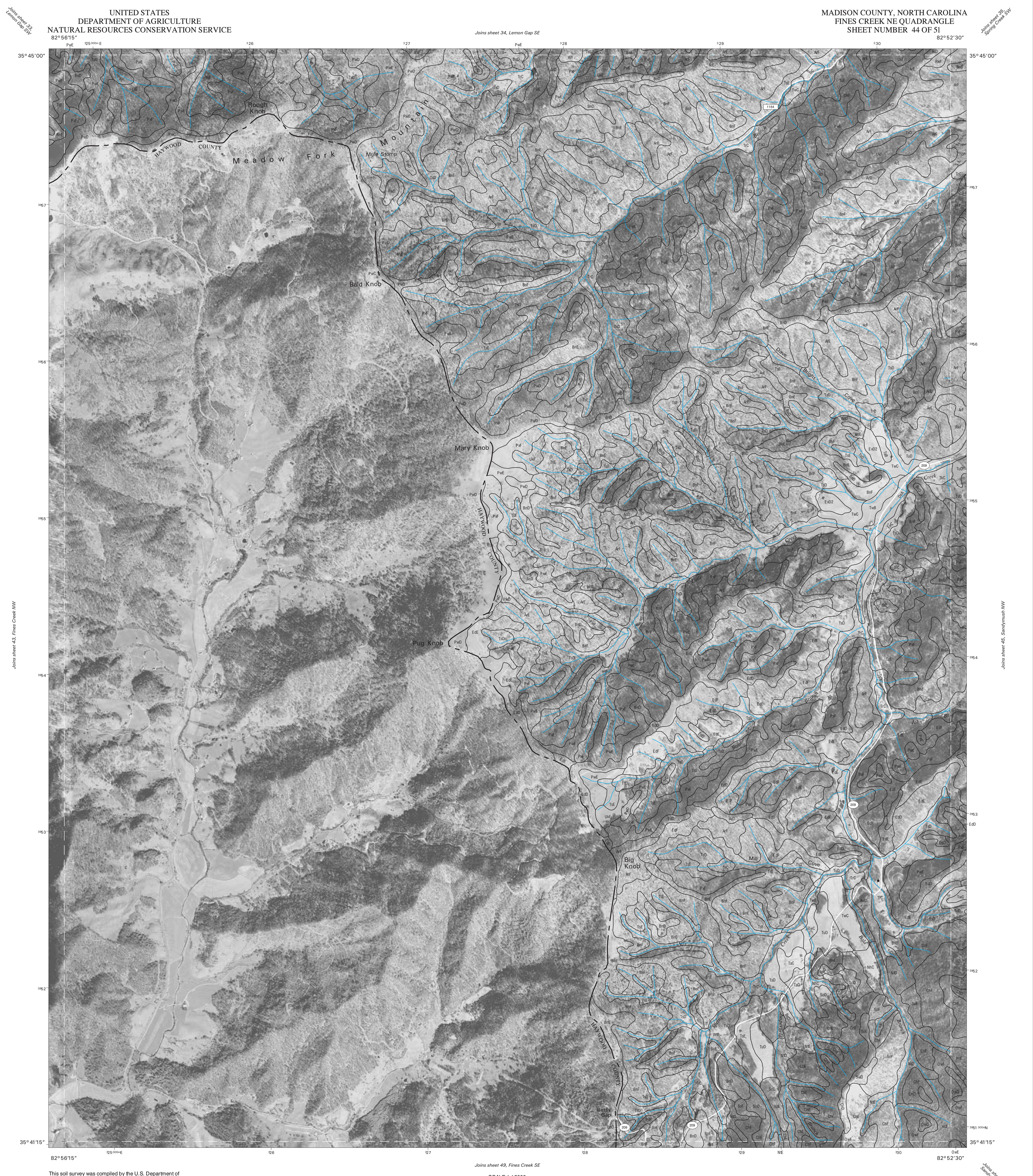
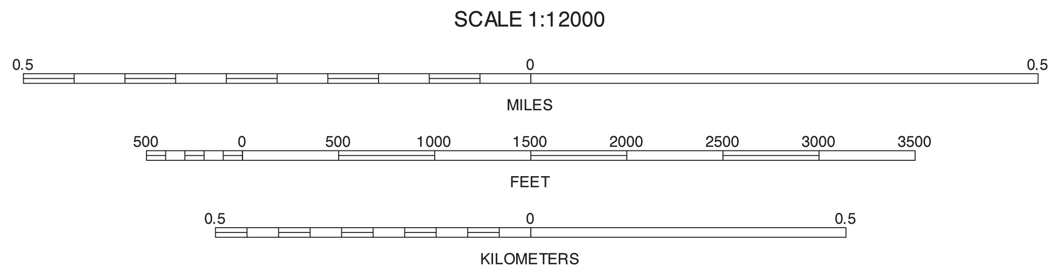
MADISON COUNTY, NORTH CAROLINA
FINES CREEK NE QUADRANGLE
SHEET NUMBER 44 OF 51



QUARTER QUADRANGLE
LOCATION



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

33	34	35
43		45
	49	50

33 LEMON GAP SW
34 LEMON GAP SE
35 SPRING CREEK SW
43 FINES CREEK NW
45 SANDYMUSH NW

49 FINES CREEK SE
50 SANDYMUSH SW

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DEPARTMENT OF AGRICULTURE
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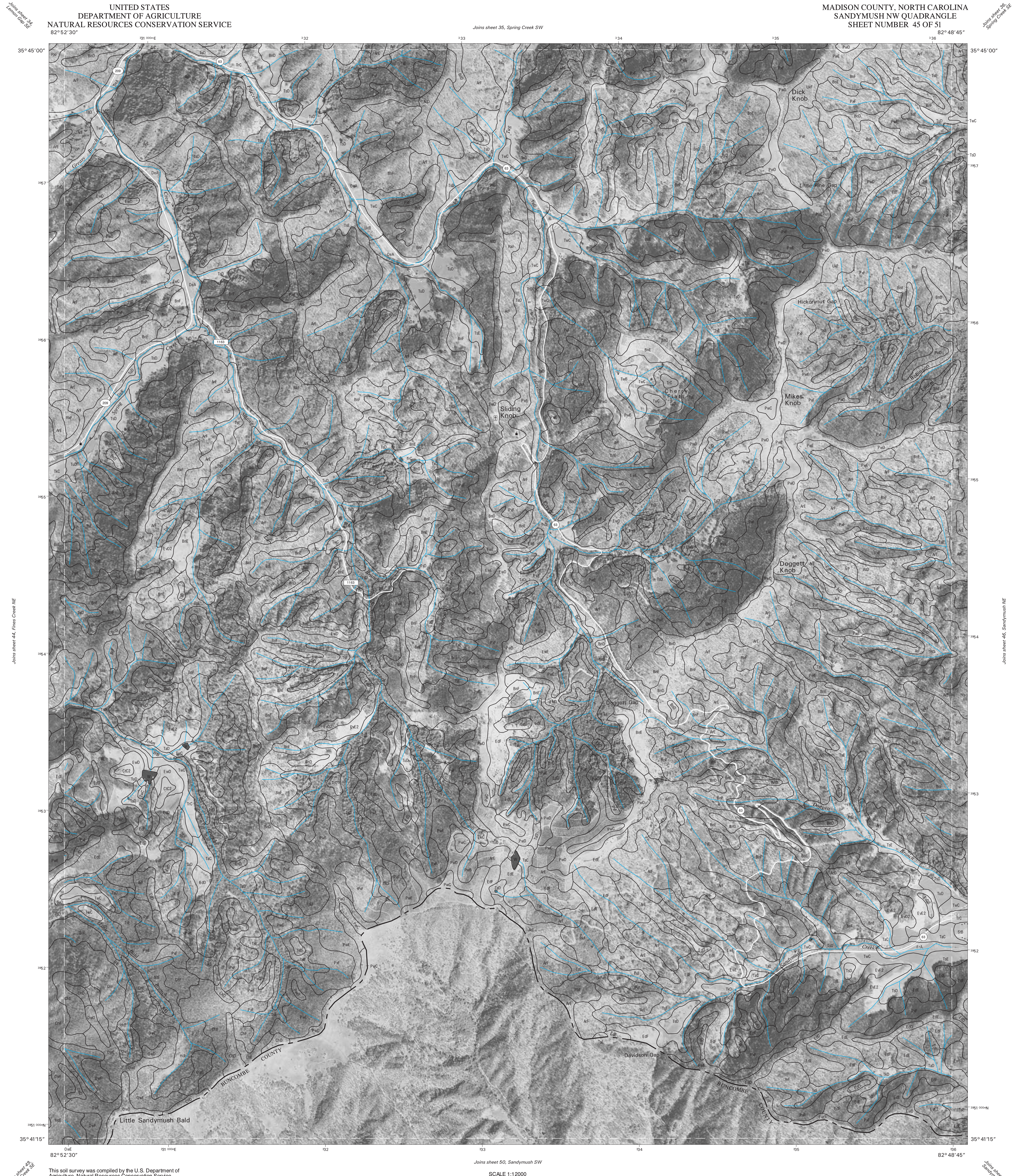
MADISON COUNTY, NORTH CAROLINA
SANDYMUSH NW QUADRANGLE
SHEET NUMBER 45 OF 51



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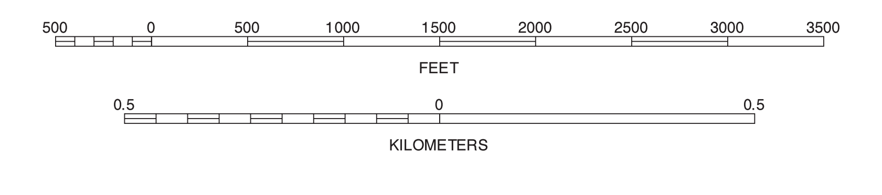
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000



34	35	36
44		46
49	50	51

34 LEMON GAP SE
35 SPRING CREEK SW
36 SPRING CREEK SE
44 FINES CREEK NE
46 SANDYMUSH NE
49 FINES CREEK SE
50 SANDYMUSH SW
51 SANDYMUSH SE

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3.75 MINUTE SERIES
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SANDYMUSH NE QUADRANGLE
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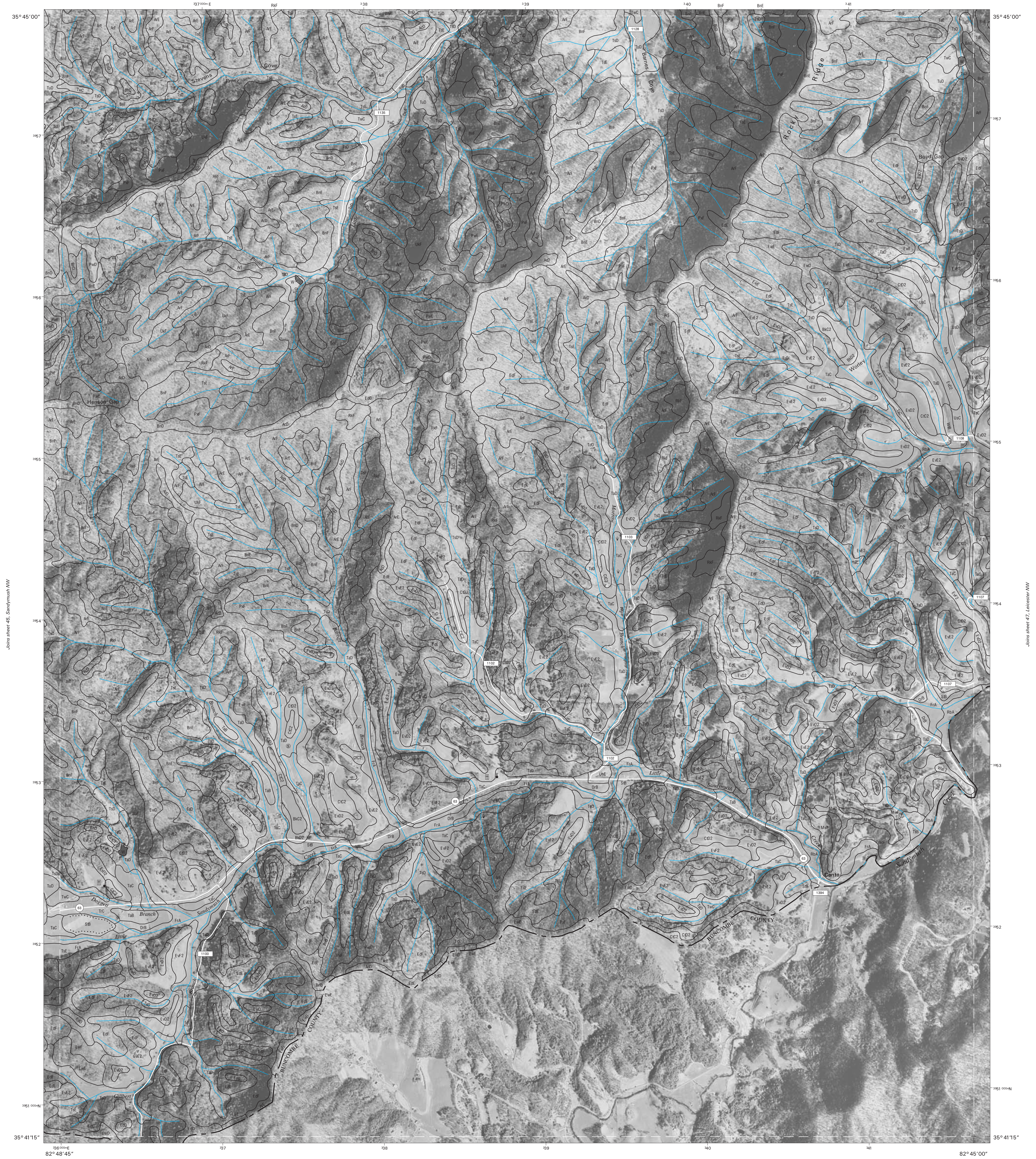
Joins sheet 35, Spring Creek SW

Joins sheet 37, Marshall SW

Joins sheet 36, Spring Creek SE



Joins sheet 50, Sandymush SW

Joins sheet 51, Sandymush SE

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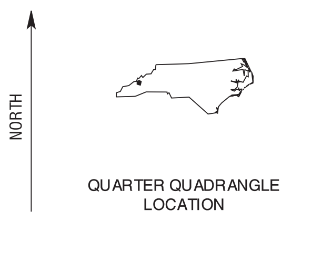

QUARTER QUADRANGLE LOCATION

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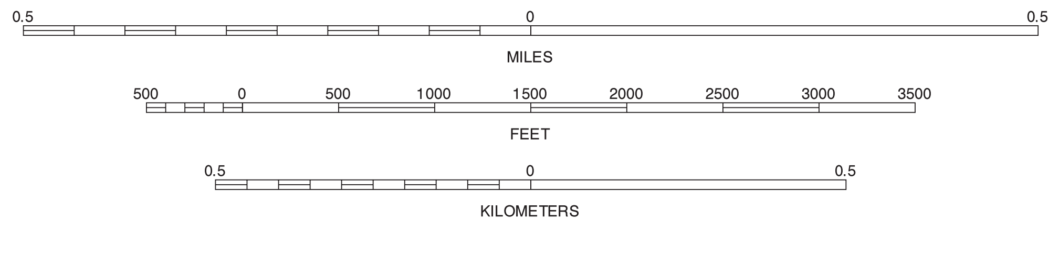

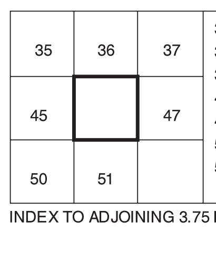

35 SPRING CREEK SW
36 SPRING CREEK SE
37 MARSHALL SW
45 SANDYMUSH NW
47 LEICESTER NW
50 SANDYMUSH SW
51 SANDYMUSH SE

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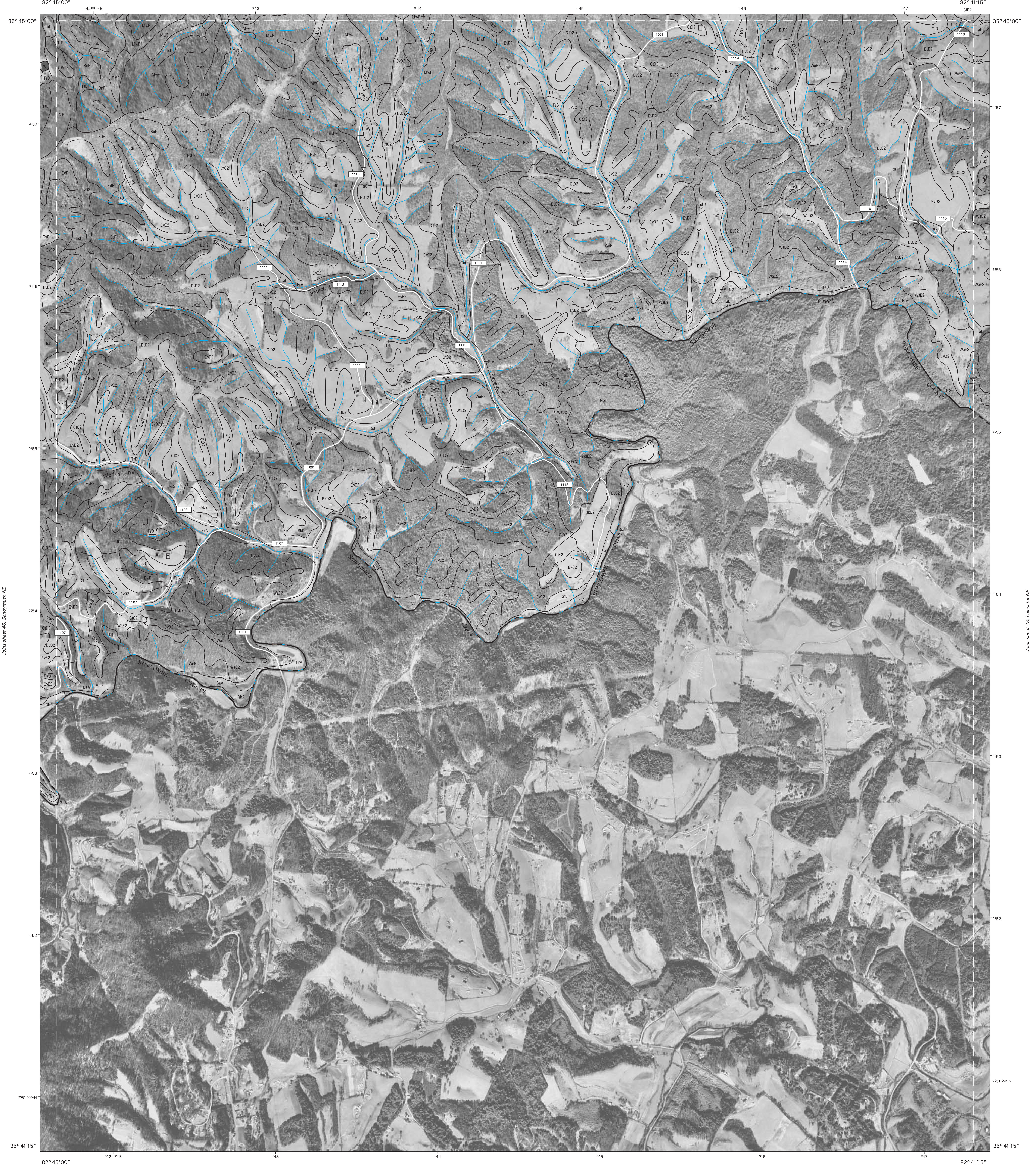
LEICESTER NW QUADRANGLE
SHEET NUMBER 47 OF 51

Joins sheet 36, Spring Creek SE

Joins sheet 38, Marshall SE

Joins sheet 37, Marshall SW



Joins sheet 51, Sandymush SE

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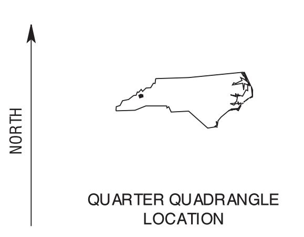
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



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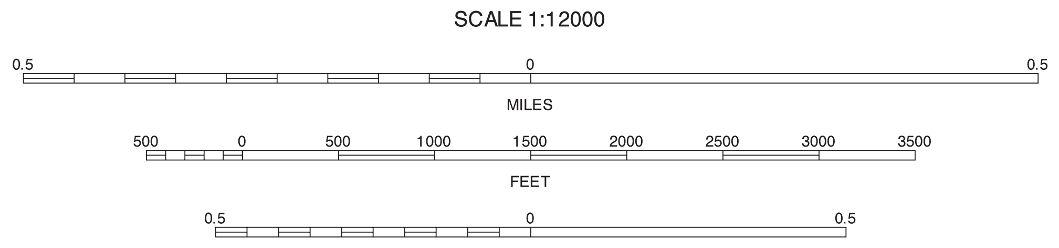

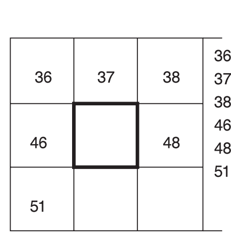

36 SPRING CREEK SE
37 MARSHALL SW
38 MARSHALL SE
46 SANDYMUSH NE
48 LEICESTER NE
51 SANDYMUSH SE

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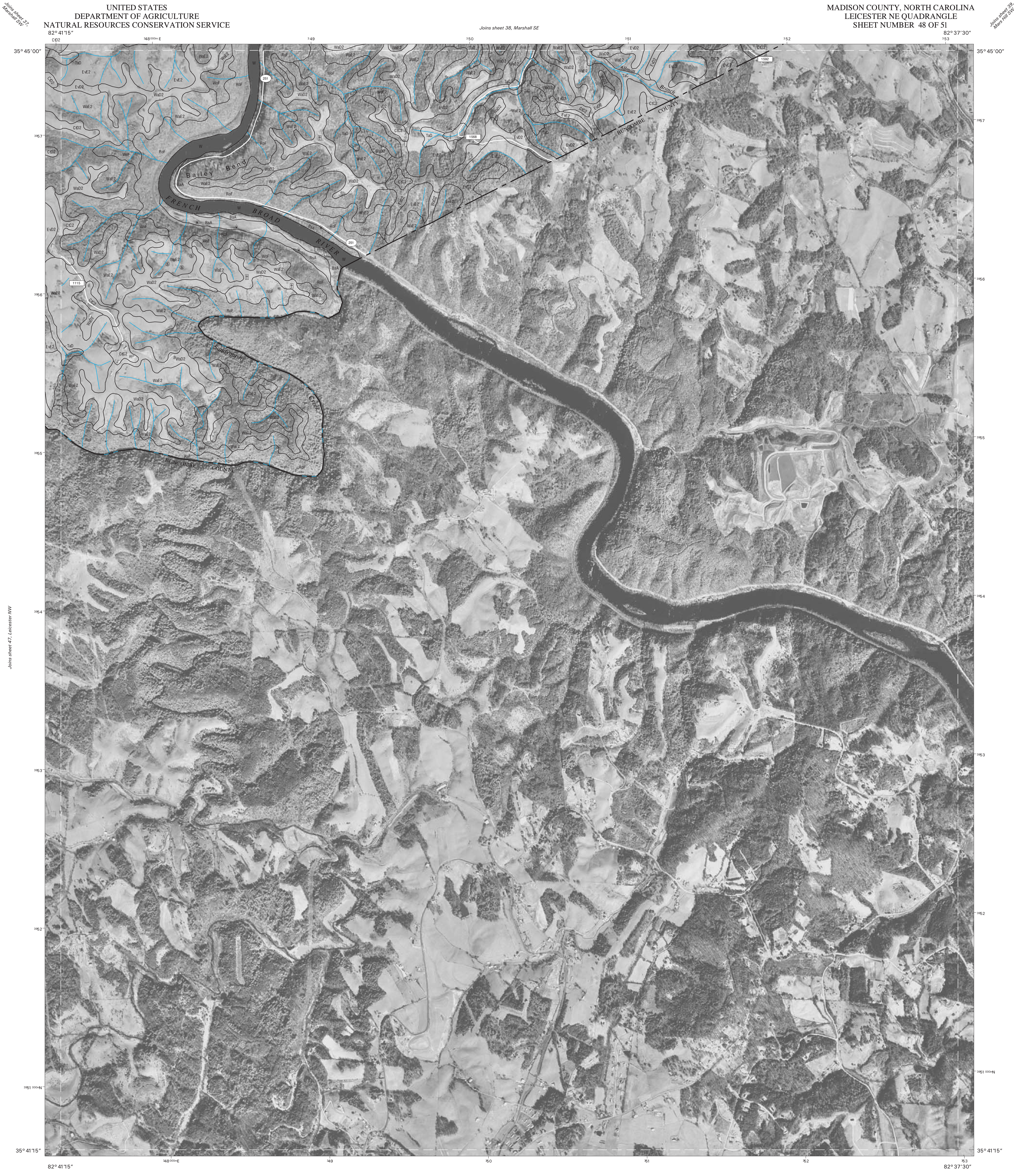
LEICESTER NE QUADRANGLE
SHEET NUMBER 48 OF 51



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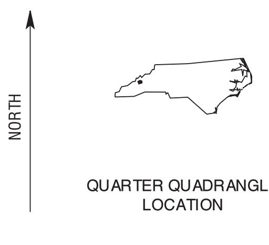

QUARTER QUADRANGLE LOCATION

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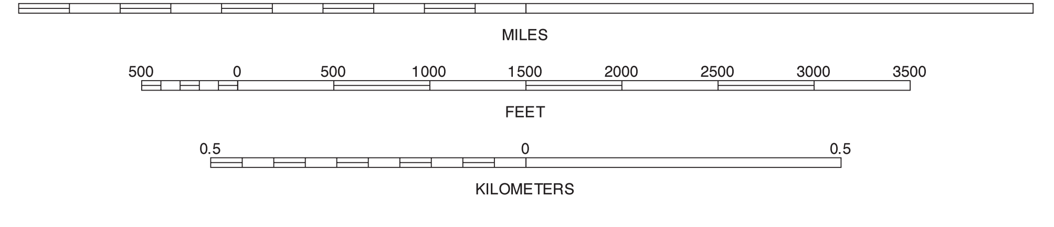

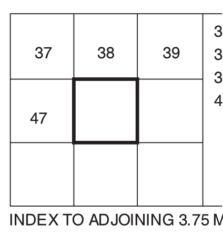

37 MARSHALL SW
38 MARSHALL SE
39 MARS HILL SW
47 LEICESTER NW

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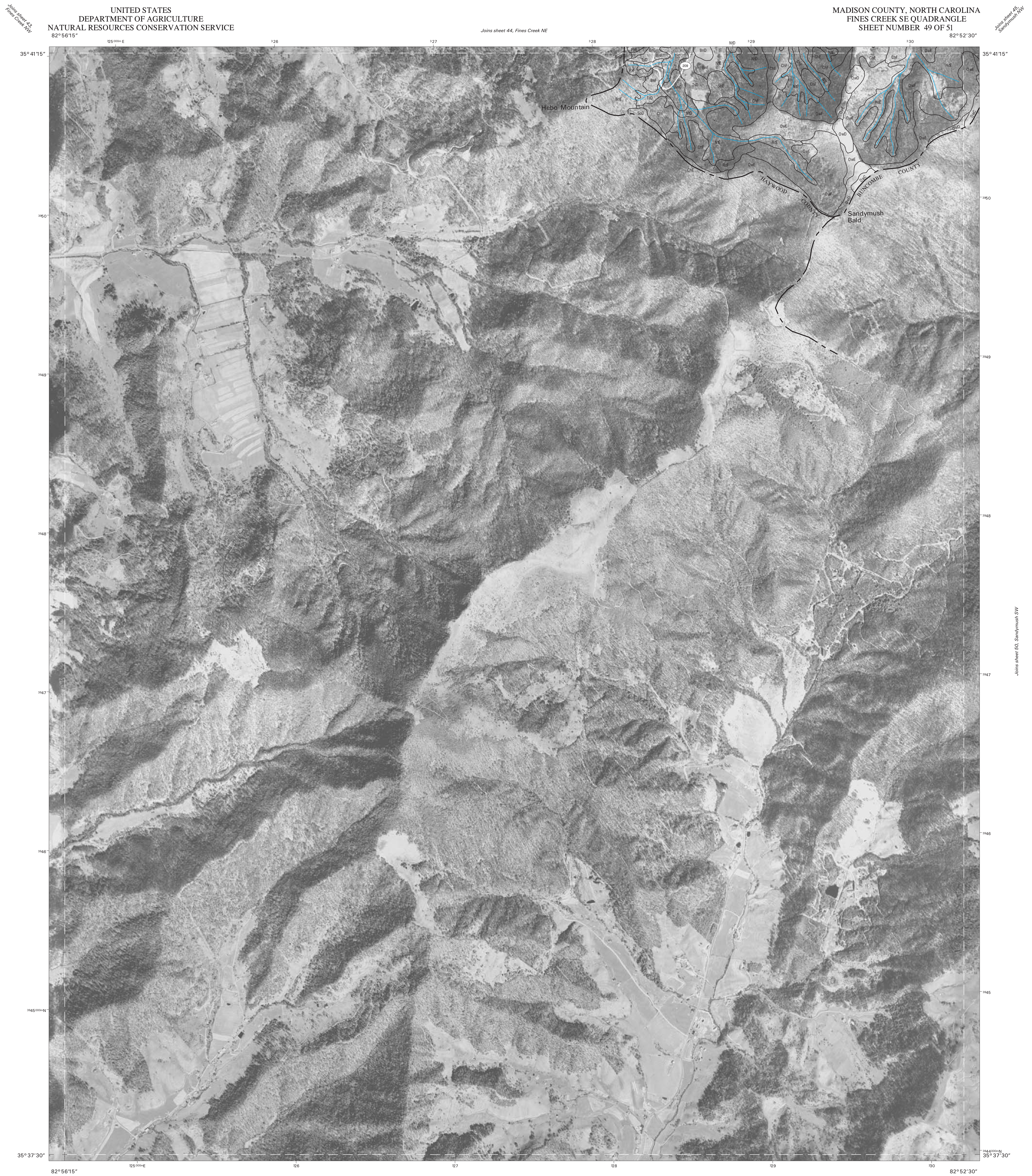
MADISON COUNTY, NORTH CAROLINA
FINES CREEK SE QUADRANGLE
SHEET NUMBER 49 OF 51



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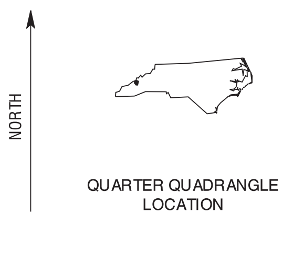

QUARTER QUADRANGLE
LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

43	44	45
		50

43 FINES CREEK NW
44 FINES CREEK NE
45 SANDYMUSH NW
50 SANDYMUSH SW

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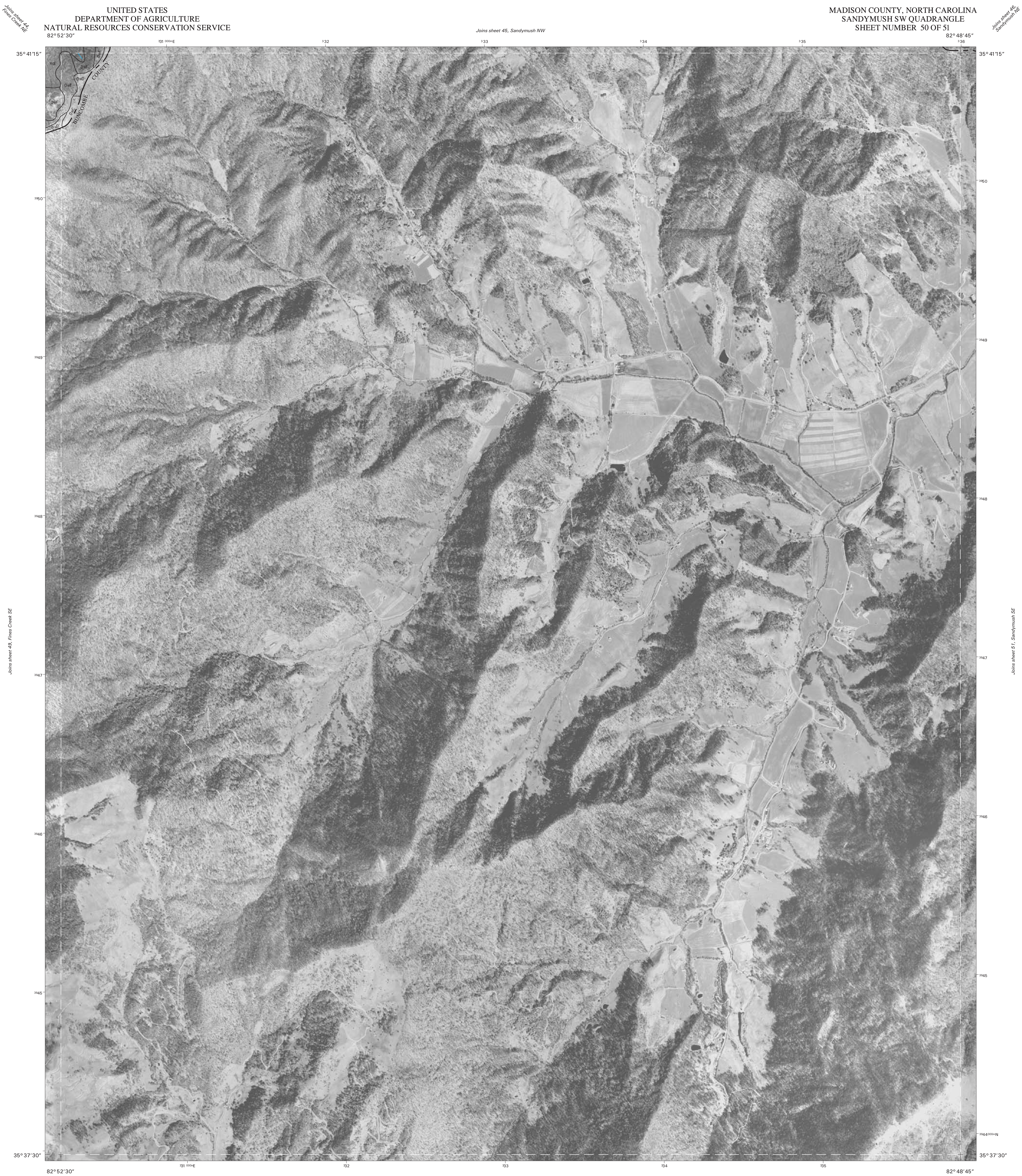
SANDYMUSH SW QUADRANGLE
SHEET NUMBER 50 OF 51


Joins sheet 44, Fines Creek NE
Joins sheet 45, Sandymush NW
Joins sheet 46, Sandymush NE
Joins sheet 49, Fines Creek SE
Joins sheet 51, Sandymush SE
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82° 48′45″
35° 41′15″
35° 37′30″
331 000mE
332
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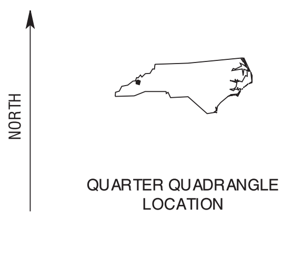
3946
3945
3944 000mN
HcE
OwF
OwE
OwD
OwC
BUNCOMBE COUNTY

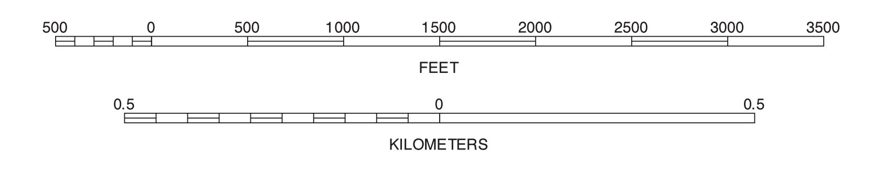
This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1998-1999 aerial photography. Hydrography and cultural features were acquired from NRCS and edited to conform with the features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUARTER QUADRANGLE LOCATION

SCALE 1:12000



44	45	46
49		51

44 FINES CREEK NE
45 SANDYMUSH NW
46 SANDYMUSH NE
49 FINES CREEK SE
51 SANDYMUSH SE

INDEX TO ADJOINING 3.75 MAPS

SANDYMUSH SW, NORTH CAROLINA
3.75 MINUTE SERIES
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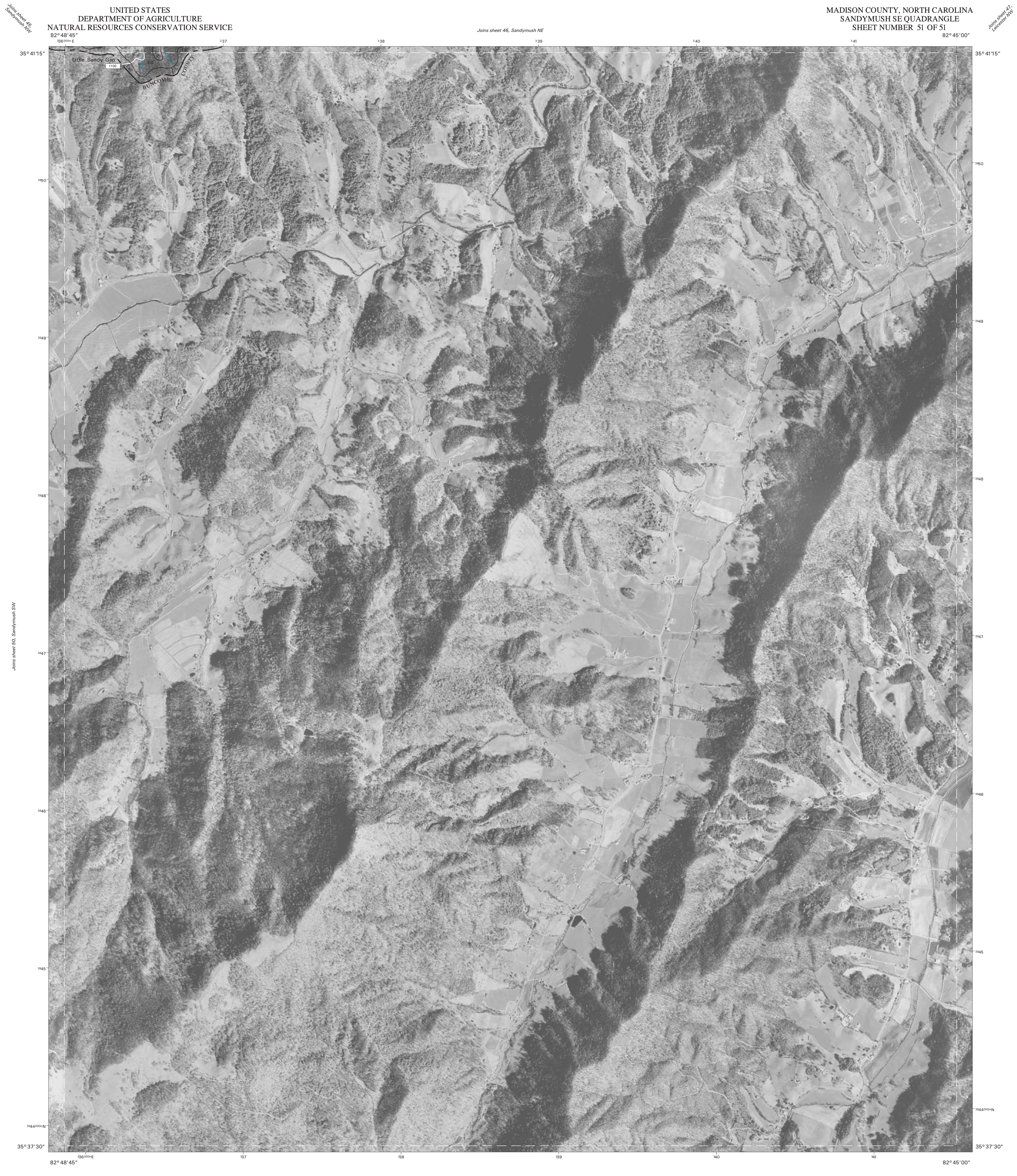
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MADISON COUNTY, NORTH CAROLINA
SANDYMUSH SE QUADRANGLE
SHEET NUMBER 51 OF 51



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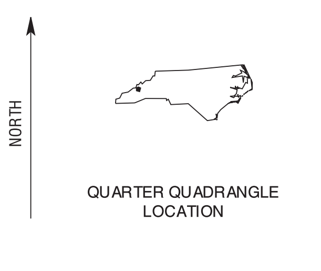

QUARTER QUADRANGLE LOCATION

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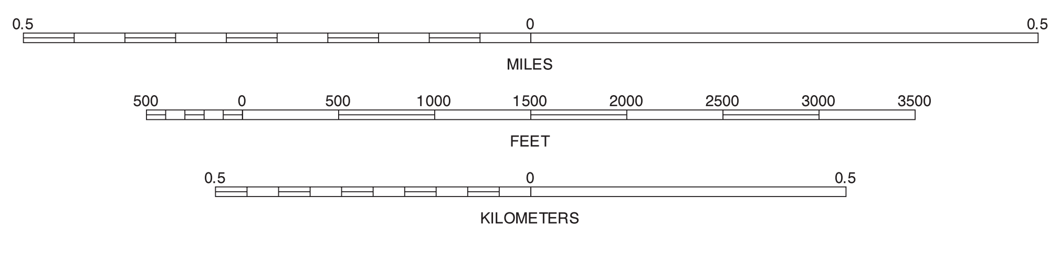

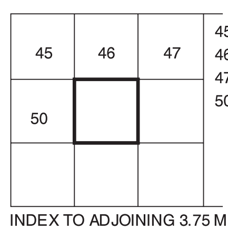

45 SANDYMUSH NW
46 SANDYMUSH NE
47 LEICESTER NW
50 SANDYMUSH SW

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